MELSEC A Series

Programmable Controllers

User's Manual
(Hardware)

AnN/AnA/AnUCPU

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IB(NA)66542
Version E

● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual.

Also pay careful attention to safety and handle the module properly.

These ● SAFETY PRECAUTIONS ● classify the safety precautions into two categories: "DANGER" and "CAUTION".

DANGER	**Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.**
CAUTION	**Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.**

Depending on circumstances, procedures indicated by CAUTION may also be linked to serious results.

In any case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

DANGER

- **Install a safety circuit external to the PLC that keeps the entire system safe even when there are problems with the external power supply or the PLC module. Otherwise, trouble could result from erroneous output or erroneous operation.**

  (1) Outside the PLC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, positioning upper and lower limits switches and interlocking forward/reverse operations.

[DESIGN PRECAUTIONS]

⚠ DANGER

(2) When the PLC detects the following problems, it will stop calculation and turn off all output in the case of (a). In the case of (b), it will stop calculation and hold or turn off all output according to the parameter setting.
Note that the AnS series module will turn off the output in either of cases (a) and (b).

(a) The power supply module has over current protection equipment and over voltage protection equipment.
(b) The PLC CPUs self-diagnosis functions, such as the watch dog timer error, detect problems.
In addition, all output will be turned on when there are problems that the PLC CPU cannot detect, such as in the I/O controller. Build a fail safe circuit exterior to the PLC that will make sure the equipment operates safely at such times. See section 9.1 of this manual for example fail safe circuits.

(3) Output could be left on or off when there is trouble in the outputs module relay or transistor. So build an external monitoring circuit that will monitor any single outputs that could cause serious trouble.

- **When overcurrent which exceeds the rating or caused by short-circuited load flows in the output module for a long time, it may cause smoke or fire. To prevent this, configure an external safety circuit, such as fuse.**

- **Build a circuit that turns on the external power supply when the PLC main module power is turned on. If the external power supply is turned on first, it could result in erroneous output or erroneous operation.**
- **When a data link results in a communication error, the faulty station changes in operating status depending on the used data link type.**

(1) For the data link data, the data prior to the communication error will be held.
(2) The MELSECNET (II,/B,/10) remote I/O station will turn all output off.
(3) The MELSECNET/MINI-S3 remote I/O station will hold the output or turn all output off depending on the E.C. remote setting.
Refer to the data link manuals regarding the method for setting the communication problem station and the operation status when there are communication problem.

[DESIGN PRECAUTIONS]

DANGER

- **When connecting a peripheral device to the CPU module or connecting a personal computer or the like to the intelligent function module to exercise control (data change) on the running PLC, configure up an interlock circuit in the sequence program to ensure that the whole system will always operate safely.**
  Also before exercising other control (program change, operating status change (status control)) on the running PLC, read the manual carefully and fully confirm safety.
  Especially for the above control on the remote PLC from an external device, an immediate action may not be taken for PLC trouble due to a data communication fault.
  In addition to configuring up the interlock circuit in the sequence program, corrective and other actions to be taken as a system for the occurrence of a data communication fault should be predetermined between the external device and PLC CPU.

- **When configuring a system, do not leave any slots vacant on the base. Should there be any vacant slots, always use a blank cover (A1SG60) or dummy module (A1SG62).**
  When the extension base A1S52B, A1S55B or A1S58B is used, attach the dustproof cover supplied with the product to the module installed in slot 0.
  If the cover is not attached, the module's internal parts may be dispersed when a short-circuit test is performed or overcurrent/overvoltage is accidentally applied to the external I/O area.

CAUTION

- **Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other. They should be installed 100 mm (3.94 inch) or more from each other. Not doing so could result in noise that would cause erroneous operation.**

- **When controlling items like lamp load, heater or solenoid valve using an output module, large current (approximately ten times greater than that present in normal circumstances) may flow when the output is turned OFF to ON.**
  Take measures such as replacing the module with one having sufficient rated current.

[INSTALLATION PRECAUTIONS]

⚠ CAUTION

- **Use the PLC in an environment that meets the general specifications contained in this manual. Using this PLC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.**

- **Hold down the module loading lever at the module bottom, and securely insert the module fixing latch into the fixing hole in the base unit.**
  Incorrect loading of the module can cause a malfunction, failure or drop.
  When using the PLC in the environment of much vibration, tighten the module with a screw.
  Tighten the screw in the specified torque range. Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.

- **When installing extension cables, be sure that the connectors of base unit are installed correctly. After installation, check them for looseness. Poor connections could cause an input or output failure.**

- **Correctly connect the memory cassette installation connector to the memory cassette. After installation, be sure that the connection is not loose. A poor connection could cause an operation failure.**

- **Completely turn off the external power supply before loading or unloading the module. Not doing so could result in electric shock or damage to the product.**

- **Do not directly touch the module's conductive parts or electronic components. Touching the conductive parts could cause an operation failure or give damage to the module.**

[WIRING PRECAUTIONS]

DANGER

- **Completely turn off the external power supply when installing or placing wiring. Not completely turning off all power could result in electric shock or damage to the product.**
- **When turning on the power supply or operating the module after installation or wiring work, be sure that the module's terminal covers are correctly attached. Not attaching the terminal cover could result in electric shock.**

CAUTION

- **Be sure to ground the FG terminals and LG terminals to the protective ground conductor. Not doing so could result in electric shock or erroneous operation.**
- **When wiring in the PLC, be sure that it is done correctly by checking the product's rated voltage and the terminal layout. Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.**
- **Do not connect multiple power supply modules in parallel. Doing so could cause overheating, fire or damage to the power supply module.**
- **External connections shall be crimped or pressure welded with the specified tools, or correctly soldered. Imperfect connections could result in short circuit, fires, or erroneous operation.**
- **Tighten the terminal screws with the specified torque. If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation. Tightening the terminal screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.**
- **Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damage, or erroneous operation.**
- **The module has an ingress prevention label on its top to prevent foreign matter, such as wire offcuts, from entering the module during wiring.**
  Do not peel this label during wiring.
  Before starting system operation, be sure to peel this label because of heat dissipation.

[STARTUP AND MAINTENANCE PRECAUTIONS]

⚠ DANGER

- **Do not touch the terminals while power is on.**
  Doing so could cause shock or erroneous operation.
- **Correctly connect the battery.**
  Also, do not charge, disassemble, heat, place in fire, short circuit, or solder the battery. Mishandling of battery can cause overheating or cracks which could result in injury and fires.
- **Switch all phases of the external power supply off when cleaning the module or retightening the terminal or module mounting screws. Not doing so could result in electric shock.**
  Undertightening of terminal screws can cause a short circuit or malfunction. Overtightening of screws can cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.

[STARTUP AND MAINTENANCE PRECAUTIONS]

⚠ CAUTION
● The online operations conducted for the CPU module being operated, connecting the peripheral device (especially, when changing data or operation status), shall be conducted after the manual has been carefully read and a sufficient check of safety has been conducted. Operation mistakes could cause damage or problems with of the module. ● Do not disassemble or modify the modules. Doing so could cause trouble, erroneous operation, injury, or fire. ● Use any radio communication device such as a cellular phone or a PHS phone more than 25cm (9.85 inch) away from the PLC. Not doing so can cause a malfunction. ● Switch all phases of the external power supply off before mounting or removing the module. If you do not switch off the external power supply, it will cause failure or malfunction of the module. ● Do not drop or give an impact to the battery installed in the module. Otherwise the battery will be broken, possibly causing internal leakage of electrolyte. Do not use but dispose of the battery if it has fallen or an impact is given to it. ● Always make sure to touch the grounded metal to discharge the electricity charged in the electricity charged in the body, etc., before touching the module. Failure to do say cause a failure or malfunctions of the module.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION
● When disposing of this product, treat it as industrial waste.

[TRANSPORTATION PRECAUTIONS]

⚠ CAUTION
● When transporting lithium batteries, make sure to treat them based on the transport regulations. (Refer to Chapter 7 for details of the controlled models.)

REVISIONS

*The manual number is given on the bottom right of the front cover.

Print Date	*Manual Number	Revision
Mar., 1995	IB(NA) 66542-A	First edition
Jan., 1996	IB(NA) 66542-B	
Sep., 1998	IB(NA) 66542-C	Correction SAFETY PRECAUTIONS, 4.5.2 Addition SPECIFICATIONS, PERFORMANCE SPECIFICATIONS, EMC STANDARDS, LOW-VOLTAGE INSTRUCTION Deletion I/O MODULE SPECIFICATIONS AND CONNECTIONS
Dec., 2002	IB(NA) 66542-D	Equivalent to Japanese version G Addition Chapter 5 Partial corrections SAFETY PRECAUTIONS, 1.1, 2.1.1, 2.1.2, 2.1.3, Chapter 3, 4.1.3, 4.2, 4.3.1, 4.3.2,4.3.3, 4.5.2, Chapter 6
Aug., 2003	IB(NA) 66542-E	Addition Chapter 7 Partial corrections SAFETY PRECAUTIONS, Section 6.1

Japanese Manual Version IB(NA)68438-H

This manual describes EMC DIRECTIVE AND LOW-VOLTAGE INSTRUCTION, the handling precautions, and error codes of the following CPUs:

- A1NCPU(P21(-S3)/R21), A2NCPU(P21(-S3)/R21), A2NCPU(P21/R21)-S1(-S4), A3NCPU(P21(-S3)/R21) (abbreviated to AnNCPU in this manual)

- A2ACPU(P21(-S3)/R21), A2ACPU(P21/R21)-S1(-S4), A3ACPU(P21(-S3)/R21) (abbreviated to AnACPU in this manual)

- A2UCPU, A2UCPU-S1, A3UCPU, A4UCPU (abbreviated to AnUCPU in this manual)

AnNCPU, AnACPU, and AnUCPU are generically abbreviated to CPU in this manual.

Manuals

The manuals related to these CPUs are listed below.
Refer to the following manuals when necessary.

Detailed manuals

- **A1N/A2N(S1)/A3NCPU User's Manual (IB-66543)**
  This manual describes the performance, functions, handling, etc., of the A1NCPU, A2NCPU(S1), and A3NCPU, and the specifications and handling for the memory cassette, power supply module, and base unit.

- **A2A/A3ACPU User's Manual (IB-66544)**
  This manual describes the performance, functions, handling, etc., of the A2ACPU(S1) and A3ACPU, and the specifications and handling of the memory cassette, power supply module, and base unit.

- **A2U(S1)/A3U/A4UCPU User's Manual (IB-66436)**
  This manual describes the performance, functions, handling, and so forth of A2UCPU(S1), A3UCPU, A4UCPU, and the specifications and handling of the memory cassette, power supply module, and base unit.

Related manuals

- **ACPU/QCPU-A(A mode) Programming Manual (Fundamentals) (IB-66249)**
  This manual describes programming methods required to create programs, device names, parameters, types of program, configuration of the memory area, etc.

- **ACPU/QCPU-A(A mode) Programming Manual (Common Instructions) (IB-66250)**
  This manual describes how to use the sequence instructions, basic instructions, application instructions and micro-computer programs.

- **AnSHCPU/AnACPU/AnUCPU/QCPU-A(A mode) Programming Manual (Dedicated Instructions) (IB-66251)**
  This manual describes the instructions that are expanded for dedicated use with the A2ACPU(S1), A3ACPU, A2UCPU(S1), A3UCPU, and A4UCPU.

- **AnACPU/AnUCPU Programming Manual (AD57 Control Instructions) (IB-66257)**
  This manual describes sequence program instructions used to control the AD57(S1)/AD58 CRT/LCD controllers with the A2ACPU(S1), A3ACPU, A2UCPU(S1), A3UCPU, and A4UCPU.

- **AnACPU/AnUCPU Programming Manual (PID Control Instructions) (IB-66258)**
  This manual describes sequence program instructions used to execute PID control with the A2ACPU(S1), A3ACPU, A2UCPU(S1), A3UCPU, and A4UCPU.

- **Building Block I/O Module User's Manual (IB-66140)**
  This manual describes the specifications of the building block I/O module.

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1.1 SPECIFICATIONS

Table 1.1 General specification

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<tr><th>Item</th><th colspan="6">Specifications</th></tr>
<tr><td>Ambient operating temperature</td><td colspan="6">0 to 50 °C</td></tr>
<tr><td>Ambient storage temperature</td><td colspan="6">–20 to 75 °C</td></tr>
<tr><td>Ambient operating humidity</td><td colspan="6">10 to 90 % RH, No-condensing</td></tr>
<tr><td>Ambient storage humidity</td><td colspan="6">10 to 90 % RH, No-condensing</td></tr>
<tr><td rowspan="5">Vibration resistance</td><td rowspan="5">Conforming to JIS B 3502, IEC 61131-2</td><td></td><td>Frequency</td><td>Acceleration</td><td>Amplitude</td><td>No. of sweeps</td></tr>
<tr><td rowspan="2">Under intermittent vibration</td><td>10 to 57Hz</td><td>——</td><td>0.075mm (0.003in.)</td><td rowspan="3">10 times each in X, Y, Z directions (for 80min.)</td></tr>
<tr><td>57 to 150Hz</td><td>9.8m/s^2</td><td>——</td></tr>
<tr><td rowspan="2">Under continuous vibration</td><td>10 to 57Hz</td><td>——</td><td>00.35mm (0.001in.)</td></tr>
<tr><td>57 to 150Hz</td><td>4.9m/s^2</td><td>——</td></tr>
<tr><td>Shock resistance</td><td colspan="6">Conforming to JIS B 3502, IEC 61131-2 (147 m/s^2, 3 times in each of 3 directions X Y Z)</td></tr>
<tr><td>Operating ambience</td><td colspan="6">No corrosive gases</td></tr>
<tr><td>Operating elevation *3</td><td colspan="6">2000m (6562ft.) max.</td></tr>
<tr><td>Installation location</td><td colspan="6">Control panel</td></tr>
<tr><td>Over voltage category *1</td><td colspan="6">II max.</td></tr>
<tr><td>Pollution level *2</td><td colspan="6">2 max.</td></tr>
</table>

*1 : This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.

*2 : This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used. Pollution level 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

*3 : Do not use or store the PC in the environment when the pressure is higher than the atmospheric pressure at sea level. Otherwise, malfunction may result. To use the PC in high-pressure environment, contact your nearest Mitsubishi representative.

2. Performance Specifications

2.1 CPU Module Performance Specifications

2.1.1 AnNCPU Module Performance Specifications

Table 2.1 shows the memory capacities of the CPU modules and the performance of their devices.

Table 2.1 Performance Specifications

Item		Performance			
		A1NCPU	**A2NCPU**	**A2NCPU-S1**	**A3NCPU**
Control system		Stored program, repeated operation			
I/O control mode		Refresh / direct mode selectable			
Programming language		Language dedicated to sequence control. (Combined use of relay symbol type, logic symbolic language and MELSAP-II(SFC)*1)			
Instruction (types)	Sequence instructions	26			
	Basic instructions	131			132
	Application instruction	103	107		110
Processing speed (Sequence instruction) (μ sec/step)		Direct mode : 1.0 to 2.3 Refresh mode : 1.0			
I/O points		256 points (X/Y0 to FF)	512 points (X/Y0 to 1FF)	1024 points (X/Y0 to 3FF)	2048 points (X/Y0 to 7FF)
Watch dog timer (WDT) (msec)		10 to 2000ms			
Memory capacity		Max. 16k bytes	Capacity of installed memory cassette		
			Max.448k bytes		
Program capacity	Main sequence program	Max. 6k steps	Max.14k steps		Max. 30k steps
	Sub-sequence program	Absent			Max. 30k steps

*1 The SFC language cannot be used with an A1NCPU.

Table 2.1 Performance Specifications (Continued)

Item	Performance			
	A1NCPU	A2NCPU	A2NCPU-S1	A3NCPU
Self-diagnosis	Watchdog error supervision Memory error detection, CPU error detection, I/O error detection, battery error detection, etc.			
Operation mode at error occurrence	Stop or continue selectable			
Output mode a switching at STOP → RUN	Selection of re-output of operation state before STOP (default)/output after operation execution			
Starting method at RUN	Initial start (Automatic restart when "RUN" switch is moved to ON position at power-on, at power restoration after power failure)			
Clock function	Year, month, day, hour, second, and day of the week (automatic leap year recognition) Accuracy: -3.9 to + 0.8s (TYP. -1.1s) /d at 0°C -1.8 to + 1.0s (TYP. -0.2s) /d at 25°C -8.5 to + 0.7s (TYP. -4.0s) /d at 55°C			
Latch (power failure compensation) range	Defaults to L1000 to 2047 (Latch range can be set for L, B, T, C, D and W relays.)			
Remote RUN/Pause contact	X0 to FF	X0 to 1FF	X0 to 3FF	X0 to 7FF
	One RUN contact and one PAUSE contact can be set. It is not possible			
Allowable momentary power failure time	20 msec	Depends on used power supply module		
5 VDC internal power consumption (A)	A1NCPU :0.53 A1NCPUP21(S3) :1.23 A1NCPUR21 :1.63	A2NCPU :0.73 A2NCPUP21(S3) :1.38 A2NCPUR21 :1.78	A2NCPU-S1 :0.73 A2NCPUP21-S1 (S4) :1.38 A2NCPUR21-S1 :1.78	A3NCPU :0.90 A3NCPUP21(S3) :1.55 A3NCPUR21 :1.95
Weight kg	A1NCPU :1.45 A1NCPUP21(S3) :1.75 A1NCPUR21 :1.75	A2NCPU :0.62 A2NCPUP21(S3) :0.92 A2NCPUR21 :0.92	A2NCPU-S1 :0.62 A2NCPUP21-S1 (S4) :0.92 A2NCPUR21-S1 :0.92	A3NCPU :0.65 A3NCPUP21(S3) :0.95 A3NCPUR21 :0.95
External dimensions mm (in)	250(H) × 135(W) ×121(D) (9.84 × 5.31 ×4.76)	250(H) × 79.5(W) ×121(D) (9.84 × 3.13 ×4.76)		

2.1.2 AnACPU Module performance specifications

Table 2.2 shows the performance specifications of the AnACPU module. Since the valid range for setting each device differs, use caution when a previous system FD, peripheral devices or an AnACPU compatible system FD are used.

Table 2.2 CPU Module Performance Specifications

Item		Performance			Remarks
		A2ACPU	A2ACPU-S1	A3ACPU	
Control system		Stored program, repeated operation			
I/O control method		Refresh method			Instructions to enable partial direct I/O are available.
Programming language		Language dedicated to sequence control Combined use of relay symbol type, logic symbolic language and MELSAP-II(SFC)			
Processing speed (Sequence instruction)		A2A (S1) : 0.2 to 0.4 μs/STEP A3A : 0.15 to 0.3 μs/STEP			
Instruction	Sequence instruction	25 types			
	Basic, application instruction	233 types		235 types	
	Dedicated instruction	200 types			
Constant scan (program start at specified intervals)		Can be set between 10 msec and 190 msec in 10 msec increments			Set in special register D9020.
Memory capacity and memory type	Memory capacity	Max. 448k bytes		Max. 768k bytes	Refer to Section 7 for detalls on memory cassette. Battery back up.
	Memory type (Memory cassette type)	A3NMCA-0 to A3NMCA-56		A3NMCA-0 to A3NMCA-56 *A3AMCA-96	

POINT

* Memory cassette A3AMCA-96 is compatible with CPUs of the following versions and later versions.

- A3ACPU Version BM
- A3ACPUP21 Version BL
- A3ACPUR21 Version AL

Example)

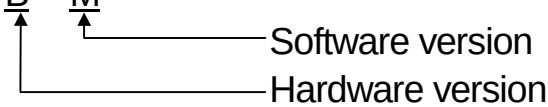


Table 2.2 CPU Module Performance Specifications (continued)

Item		Performance			Remarks
		A2ACPU	A2ACPU-S1	A3ACPU	
Main sequence program capacity		6k steps			Set in parameters.
		(Can be set to max. 14k steps		(Can be set to max. 30k steps)	
Sub-sequence program capacity		Absent		0 to 30k steps can be set.	Set in parameters.
I/O points		512 points	1024 points	2048 points	The number of points which can be used for accessibility to actual I/O modules.
STOP → RUN output mode		Selection of re-output of operation state before STOP (default)/output after operation execution			Set in parameters.
Self-diagnostic functions		Watchdog error timer (watchdog timer 200 msec fixed) Memory error detection, CPU error detection, I/O error detection, battery error detection, etc.			
Starting method at RUN		Automatic restart when "RUN" switch is moved to ON position (initial start)			
Allowable momentary power failure time		Depends on used power supply module			
Latch (power failure compensation) range		Using parameter setting, M, L, and S relays 0 to 8191, can be set in latch relay as L0 to L8191 (defaults to L1000 to L2047)			Set range in parameters.
Remote RUN/PAUSE contact		RUN/PAUSE contact point can be set by the parameter settings for A2A, A2A-S1, and A3 within the following range. A2A: X0 to X1FF, A2A-S1: X0 to X3FF, and A3A: X0 to X7FF.			
Operation mode at the time of error		I/O, special function module error: Stop, Operation error: continue			Can be changed to operation error stop.
Clock function		Year, month, day, hour, minute, second, day of the week (leap year is automatically identified.) Accuracy -2.3 to + 4.4s (TYP. +1.8s) /d at 0°C -1.1 to + 4.4s (TYP. +2.2s) /d at 25°C -9.6 to + 2.7s (TYP. -2.4s) /d at 55°C			
Other functions	Step RUN	• Execution per instruction • Execution per circuit ladder block • Execution according to loop count and step interval specification • Execution according to loop count and break point specification • Execution according to device status			
	Interrupt processing	Interrupt program can be run in response to a signal from an interrupt unit or by a constant-cycle interrupt signal.			
	Data link	Data link system incorporating local PCs and/or remote I/O can be constructed.			

Table 2.2 CPU Module Performance Specifications (continued)

Item	Performance			Remarks
	A2ACPU	A2ACPU-S1	A3ACPU	
Current consumption (A)	A2ACPU : 0.4 A2ACPUP21(S3) : 1.0 A2ACPUR21 : 1.4	A2ACPU-S1: 0.4 A2ACPUP21-S1 (S4) : 1.0 A2ACPUR21-S1 : 1.4	A3ACPU : 0.6 A3ACPUP21(S3) : 1.0 A3ACPUR21 : 1.6	Differs according to memory cassette.
Weight kg	A2ACPU : 0.7 A2ACPUP21(S3) : 0.9 A2ACPUR21 : 0.9	A2ACPU-S1 : 0.7 A2ACPUP21-S1 (S4) : 0.9 A2ACPUR21-S1 : 0.9	A3ACPU : 0.7 A3ACPUP21(S3) : 0.9 A3ACPUR21 : 1.0	
External dimensions mm (in)	250(H) × 79.5(W) × 121(D) (9.84 × 3.13 × 4.76)			

2.1.3 AnUCPU Module Performance Specifications

This section explains the performance specifications and devices of the AnUCPU.

Table 2.3 Performance Specifications

Item			Performance				Remarks
			A2UCPU	A2UCPU-S1	A3UCPU	A4UCPU	
Control system			Stored program, repeated operation				
I/O control method			Refresh method				Instructions to enable partial direct I/O are available.
Programming language			Language dedicated to sequence control				
			Combined use of relay symbol type, logic symbolic language and MELSAP-II (SFC)				
Processing speed (Sequence instruction) (μ sec/step)			0.2		0.15		
Inst-ruction (types)	Sequence instruction		25				
	Basic, application instruction		233		235		
	Dedicated instruction		204				
Constant scan (program start at specified intervals)			Can be set between 10 msec and 190 msec in 10 msec increments				Set in special register D9020.
Memory capacity			Capacity of installed memory cassette (Max. 448 kbytes)		Capacity of installed memory cassette (Max. 1024 kbytes)		
Program capacity	Main sequence program		Max. 14k steps		Max. 30k steps		Set in parameters.
	Sub-sequence program		Absent		Max. 30k steps	Max. 30k steps × 3	
I/O device points			8192 points (X/Y0 to 1FFF)				The number of points usable in the program
I/O points			512 points (X/Y0 to 1FF)	1024 points (X/Y0 to 3FF)	2048 points (X/Y0 to 7FF)	4096 points (X/Y0 to FFF)	The number of points which can be used for accessibility to actual I/O modules

Table 2.3 Performance Specifications (continued)

Item	Performance				Remarks
	A2UCPU	A2UCPU-S1	A3UCPU	A4UCPU	
Output mode switching at STOP → RUN	Selection of re-output of operation state before STOP (default)/output after operation execution				Set in parameters.
Self-diagnostic functions	Watchdog timer (watchdog timer 200 msec fixed) Memory error detection, CPU error detection, I/O error detection, battery error detection, etc.				
Operation mode at error occurrence	Stop or continue selectable				Set in parameters.
Starting method at RUN	Initial start (Automatic restart when "RUN" switch is moved to ON position at power-on, at power restoration after power failure)				
Latch (power failure compensation) range	Defaults to L1000 to L2047 (Latch range can be set for L, B, T, C, D and W relays.)				Set range in parameters.
Remote RUN/PAUSE contact	One RUN contact and one PAUSE contact can be set within the range from X0 to X1FFF				Set in parameters.
Step RUN	Can execute or stop sequence program operation.				
Interrupt processing	Interrupt program can be run in response to a signal from an interrupt unit or by a constant-cycle interrupt signal.				
Data link	MELSECNET/10, MELSECNET (II)				
Allowable momentary power failure time	Depends on used power supply module				
5 VDC internal power consumption (A)	0.4	0.4	0.5	0.5	
Weight kg	0.5	0.5	0.6	0.6	
External dimensions mm (in)	250(H) × 79.5(W) × 121(D) (9.84 × 3.13 × 4.76)				

CAUTION

When the existing system software package and peripheral devices are used, the applicable device range is limited.

3.1 Requirements for Compliance to EMC Directive (89/336/EEC)

The EMC Directive (89/336/EEC) will become mandatory within Europe from January 1st 1996. The EMC directive in essence defines the amount of electromagnetic output a product is allowed to produce and how susceptible that product is to electromagnetic interference. Any manufacturer or importer of electrical/electronic apparatus must before releasing or selling products within Europe after that date have either a CE mark attached to their goods. Testing to comply with the directive is done by use of agreed European standards which define limits for radiated and mains conducted electromagnetic emissions from equipment, levels of immunity to radiated emissions, ability for equipment to cope with transient voltage surges and electro-static discharges.
When installed in the specified manner this unit will be compliant with the relevant standards EN50081-2 and prEN50082-2 as applicable in the EMC directive. Failure to comply with these instructions could lead to impaired EMC performance of the equipment and as such Mitsubishi Electric Corporation can accept no liability for such actions.

3.1.1 EMC standards

When the PLC is installed following the directions given in this manual its EMC performance is compliant to the following standards and levels as required by the EMC directive.

Specifications	Test Item	Test Description	Standard Values
EN50081-2: 1995	EN55011 Radiated noise	Measure the emission released by the product.	30M-230 M Hz QP : 30dBμ V/m (30m measurement) *1 230M-1000MHz QP : 37dBμ V/m (30m measurement)
	EN55011 Conduction noise	Measure the emission released by the product to the power line.	150k-500kHz QP• 79dB, Mean•66dB*1 500k-30MHz QP• 73dB, Mean•60dB
prEN50082-2• 1991	IEC801-2 Static electricity immunity *2	Immunity test by applying static electricity to the module enclosure.	4kV contact discharge 8kV air discharge
	IEC801-3 Radiated electromagnetic field *2	Immunity test by applying aradiated electric field to the product.	10V/m, 27-500MHz
	IEC801-4 First transient burst noise	Immunity test by applying burst noise to the power line and signal cable.	2kV

Specifications	Test Item	Test Description	Standard Values
EN50082-2• 1995	EN61000-4-2 Static electricity immunity *2	Immunity test by applying static electricity to the module enclosure.	4kV contact discharge 8kV air discharge
	EN61000-4-4 First transient burst noise	Immunity test by applying burst noise to the power line and signal cable., 2kV	2kV
	ENV50140 Radiated electromagnetic field AM modulation *2	Immunity test by applying aradiated electric field to the product.	10V/m, 80-1000MHz, 80% AM modulation@1kHz
	ENV50204 Radiated electromagnetic field Pulse modulation *2	Immunity test by applying aradiated electric field to the product.	10 V/m, 900MHz, 80% AM modulation@1 k Hz
	ENV50141 Conduction noise	Immunity test by inducting an electromagnetic field in the power line signal cable.	10 V/ms, 0.15-80MHZ, 80% AM modulation@1kHz

(*1) QP: Quasi-peak value, Mean : Average value

(*2) The PLC is an open type device (device installed to another device) and must be installed in a conductive control box.
The tests for the corresponding items were performed while the PLC was installed to inside the control box.

3.1.2 Installation inside the control cabinet

Since the PLC is an open type device (device incorporated into another device), it must be installed in the control cabinet. This has a good effect of not only for assuring safety but also for shielding noise emitted from the PLC, by means of the control cabinet.

(1) Control cabinet

(a) Use a conductive control cabinet.

(b) When attaching the control cabinet's top plate or base plate, mask painting and weld so that good surface contact can be made between the cabinet and plate.

(c) To ensure good electrical contact with the control cabinet, mask the paint on the installation bolts of the inner plate in the control cabinet so that contact between surfaces can be ensured over the widest possible area.

(d) Earth the control cabinet with a thick wire so that a low impedance connection to ground can be ensured even at high frequencies. (22mm2 wire or thicker is recommended.)

(e) Holes made in the control cabinet must be 10cm (3.94in.) diameter or less. If the holes are 10cm (3.94in.) or larger, radio frequency noise may be emitted.

(2) Connection of power and ground wires
Earthing and power supply wires for the PLC system must be connected as described below.

(a) Provide an earthing point near the power supply module. Earth the power supply's LG and FG terminals (LG : Line Ground, FG : Frame Ground) with the thickest and shortest wire possible. (The wire length must be 30cm (11.18in.) or shorter.) The LG and FG terminals function is to pass the noise generated in the PC system to the ground, so an impedance that is as low as possible must be ensured. As the wires are used to relieve the noise, the wire itself carries a large noise content and thus short wiring means that the wire is prevented from acting as an antenna.

Note) A long conductor will become a more efficient antenna at high frequency.

(b) The earth wire led from the earthing point must be twisted with the power supply wires. By twisting with the earthing wire, noise flowing from the power supply wires can be relieved to the earthing. However, if a filter is installed on the power supply wires, the wires and the earthing wire may not need to be twisted.

3.1.3 Cables

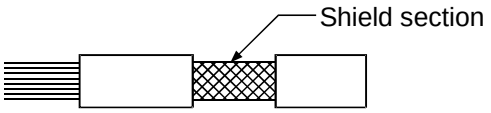
The cables led from the control cabinet contain a high frequency noise element and outside the control panel these cables act as antennae and radiate noise. The cables connected to input/output modules or special modules which leave the control panel must always be shielded cables.
Mounting of a ferrite core on the cables is not required (excluding some models) but if a ferrite core is mounted, the noise radiated through the cable can be suppressed further.
Use of a shielded cable is also effective for increasing the noise immunity level. The PLC system's input/output and special function module provide a noise immunity level of equivalent to that stated in IEC801-4 : 2 k V when a shielded cable is used. If a shielded cable is not used or if the shield earthing treatment is not suitable even when used (See Section 9.1.2.4), the noise immunity level is less than 2 kV.

Note) prEN50082-2 specifies the noise resistance level based on the signal wire application.
Signals involved in process control : 2kV
Signals not involved in process control : 1kV

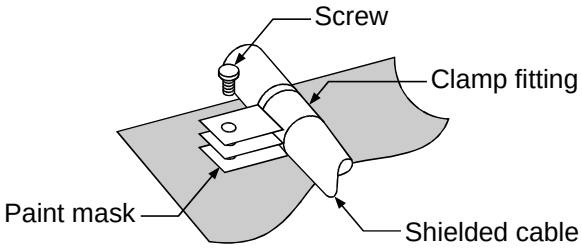
The meaning of "involved in process control" is not defined in prEN50082-2. However, when the purposes of the EMC Directive are considered, the signals that could cause personal injury or risks in the facility if a malfunction occurs should be defined as "signals involved in process control". Thus, it is assumed that a high noise immunity level is required.

(1) Shield earthing

When a shield of the shielded cable is earthed to the cabinet body, please ensure that the shield contact with the body is over a large surface area. If the cabinet body is painted it will be necessary to remove paint from the contact area. All fastenings must be metallic and the shield and earthing contact must be made over the largest available surface area. If the contact surfaces are too uneven for optimal contact to be made either use washers to correct for surface inconsistencies or use an abrasive to level the surfaces. The following diagrams show examples of how to provide good surface contact of shield earthing by use of a cable clamp.

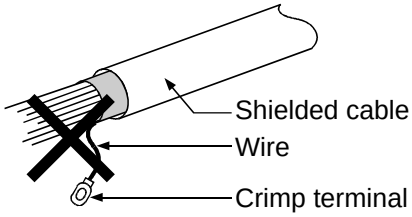


(a) Peal the cable insulation off and expose the shield section



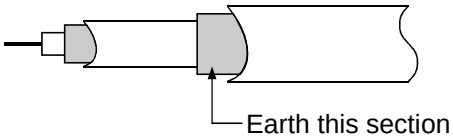
(b) Sandwich the exposed shield section with the and earth to the control cabinet over a wide area.

Note) The method of earthing by soldering a wire onto the shield section of the shielded cable as shown below is not recommended. The high frequency impedance will increase and the shield will be ineffective.



(2) MELSECNET/II module

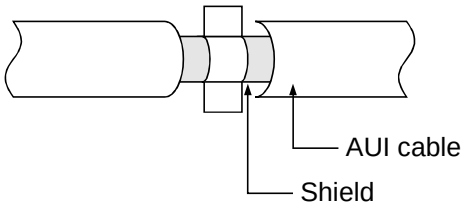
(a) The following requirements apply to AJ71AR21, AJ71BR11, AnNCPUR21, AnACPUR21.
Always use a triaxial cable for the module. The radiated noise in the band of 30 M Hz or higher can be suppressed by using a triax cable. Earth the outer shield by the method described in (1).



(b) Always mount a ferrite core onto the triaxial cable. Mount the ferrite core near the control cabinet outlet of each cable. Use of the TDK ZCAT3035 ferrite core is recommended.

(3) Ethernet module

(a) Always earth the AUI cable connected to the A1SJ71E71-B5. The AUI is a shielded cable so remove the outer insulation and connect to earth the exposed shield section using as wide a surface area as possible in the manner shown below.

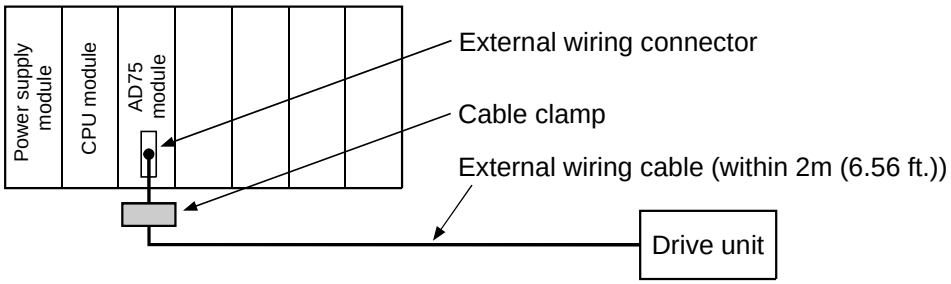


(b) Always use a triaxial cable for the coaxial cable connected to the A1SJ71E71-B2. The earthing precautions are the same as (1).

(c) For A1SJ71E71-B2/B5, always mount a ferrite core in addition to items (1) and (2) above. Use of the TDK ZCAT3035 ferrite core is recommended.

(4) Positioning Modules

(a) When wiring with a 2m (6.6ft.) or less cable
Ground the shield section of the external wiring cable with the cable clamp.
(Ground the shield at the closest location to the AD75 external wiring connector.)
Wire the external wiring cable to the drive unit and external device with the shortest distance.
Install the drive unit in the same panel.



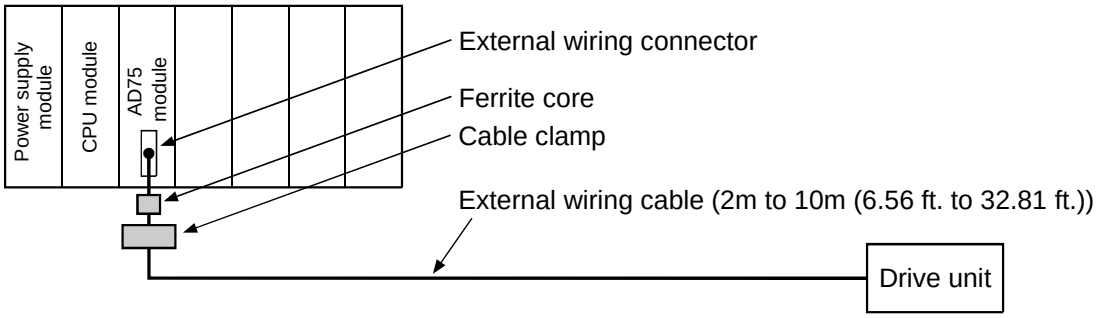
(b) When wiring with cable that exceeds 2m (6.6ft.), but is 10m (32.8ft.) or less

Ground the shield section of the external wiring cable with the cable clamp.

(Ground the shield at the closest location to the AD75 external wiring connector.)

Install a ferrite core.

Wire the external wiring cable to the drive unit and external device with the shortest distance.



(c) Ferrite core and cable clamp types and required quantities

1) Cable clamp

Type : AD75CK (Mitsubishi Electric)

2) Ferrite core

Type : ZCAT3035-1330 (TDK ferrite core)

3) Required quantity

Cable lenght	Prepared part	Required Qty		
		1 axis	2 axis	2 axis
Within 2m (6.6ft.)	AD75CK	1	1	1
2m (6.6ft.) to 10m (32.8ft.)	AD75CK	1	1	1
	ZCAT3035-1330	1	2	3

(5) I/O and other communication cables

Always earth the shield section of the I/O signal cables and other communication cables (RS-232-C, RS-422, etc.) in the same manner as described in (1) if the cables go outside of the control cabinet.

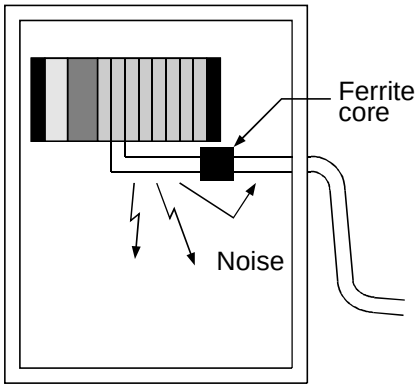
3.1.4 Power supply module

The precautions required for each power supply module are described below. Always observe the items noted as precautions.

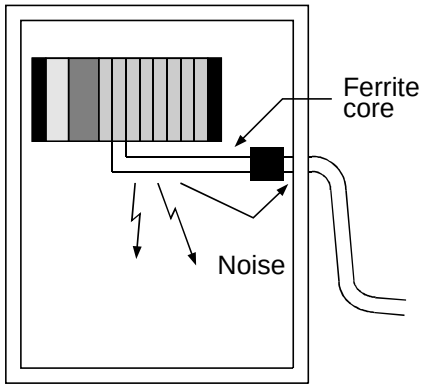
Model	Precautions
A1NCPU (Power supply), A61P, A62P	Always ground the LG and FG terminals after short-circuiting them.
A63P	Use the 24VDC panel power equipment conforming to the EU Directive.
A65P, A66P, A67P	None

3.1.5 Ferrite core

A ferrite core is effective for reducing noise in the band of 30 M Hz to 100 M Hz. Mounting of a ferrite core is not necessary except for some particular models described in Section 9.1.3 (2), (3). However if further attenution of noise is necessary, mounting of a ferrite core on cables which radiate noise is recommended. When a ferrite core is mounted, mount the ferrite core just before the point where the cable goes outside of the cabinet. The ferrite will not be effective if the mounting position is not adequate.



(a) When there is a distance from the cable exit hole, the noise will jump over the ferrite, thus the effect will be halved.



(b) When mounted by the cable exit hole, the noise will not jump over the ferrite.

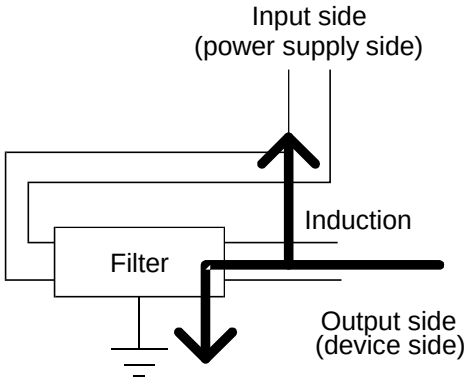
3.1.6 Noise filter (power supply line filter)

The noise filter (power supply line filter) is a device effective to reduce conducted noise. Except some particular models described in Section 9.1.3 (5), installation of a noise filter onto the power supply lines is not necessary. However conducted noise can be reduced if it is installed. (The noise filter is generally effective for reducing conducted noise in the band of 10 M Hz or less.) Usage of the following filters is recommended.

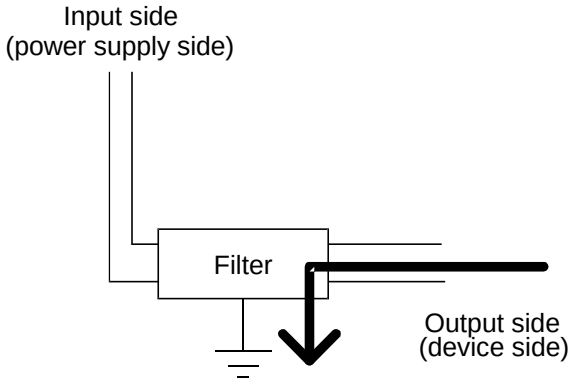
Model name	FN343-3/01	FN660-6/06	ZHC2203-11
Manufacturer	SCHAFFNER	SCHAFFNER	TDK
Rated current	3A	6A	3A
Rated voltage	250V		

The precautions required when installing a noise filter are described below.

(1) Do not bundle the wires on the input side and output side of the noise filter. When bundled, the output side noise will be induced into the input side wires from which the noise was filtered.



(a) The noise will be included when the input and output wires are bundled.



(b) Separate and lay the inputand output wires.

(2) Earth the noise filter earthing terminal to the control cabinet with the shortest wire possible (approx. 10cm (3.94in.)).

3.2 Requirement to Conform to the Low-Voltage Instruction

The low-voltage instruction, one of the European Instructions, is now regulated.
The low-voltage instruction require each device which operates with power supply ranging from 50 V AC to 1000 V and 75 V DC to 1500 V to satisfy necessary safety items.
In the Sections from 3.2.1 to 3.2.7, cautions on installation and wiring of the MELSEC-A series PC to conform to The Low Voltage Directive requires are described.
We have put the maximum effort to develop this material based on the requirements and standards of the regulation that we have collected. However, compatibility of the devices which are fabricated according to the contents of this manual to the above regulation is not guaranteed. Each manufacturer who fabricates such device should make the final judgement about the application method of the low-voltage instruction and the product compatibility.

3.2.1 Standard applied for MELSEC-A

The standard applied for MELSEC-A is EN61010-1 safety of devices used in measurement rooms, control rooms, or laboratories.
For the modules which operate with the rated voltage of 50VAC/75VDC or above, we have developed new models that conform to the above standard.
For the modules which operate with the rated voltage under 50VAC/75VDC, the conventional models can be used, because they are out of the Low Voltage Directive application range.

3.2.2 Precautions when using the A series

Module selection

(1) Power module
For a power module with rated input voltage of 100/200VAC, select a model in which the internal part between the first order and second order is intensively insulated, because it generates hazardous voltage (voltage of 42.4V or more at the peak) area.
For a power module with 24VDC rated input, a conventional model can be used.

(2) I/O module
For I/O module with rated input voltage of 100/200VAC, select a model in which the internal area between the first order and second order is intensively insulated, because it has hazardous voltage area.
For I/O module with 24VDC rated input, a conventional model can be used.

(3) CPU module, memory cassette, base unit
Conventional models can be used for these modules, because they only have a 5VDC circuit inside.

(4) Special module
Conventional models can be used for the special modules including analog module, network module, and positioning module, because the rated voltage is 24VDC or less.

(5) Display device
Use an A900 series GOT CE compatible model.

3.2.3 Power supply

The insulation specification of the power module was designed assuming installation category II. Be sure to use the installation category II power supply to the PC.
The installation category indicates the durability level against surge voltage generated by lighening strike. Category I has the lowest durability; category IV has the highest durability.

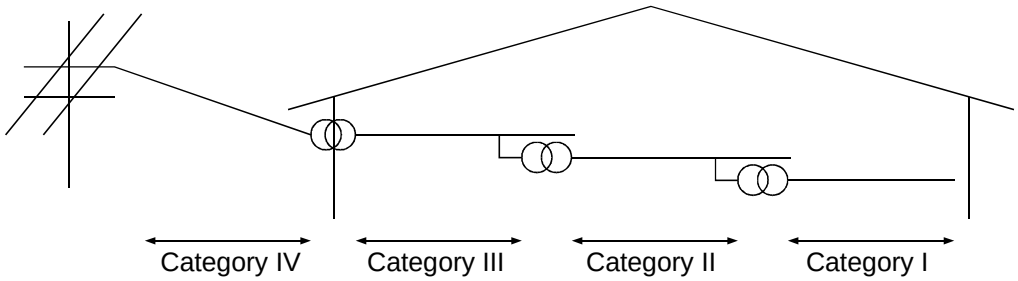


Figure 1. : Installation Category

Category II indicates a power supply whose voltage has been reduced by two or more levels of isolating transformers from the public power distribution.

3.2.4 Control box

Because the PLC is an open device (a device designed to be stored within another module), be sure to use it after storing in the control box.

(1) Electrical shock prevention

In order to prevent persons who are not familiar with the electric facility such as the operators from electric shocks, the control box must have the following functions :

(a) The control box must be equipped with a lock so that only the personnel who has studied about the electric facility and have enough knowledge can open it.

(b) The control box must have a structure which automatically stops the power supply when the box is opened.

(2) Dustproof and waterproof features

The control box also has the dustproof and waterproof functions. Insufficient dustproof and waterproof features lower the insulation withstand voltage, resulting in insulation destruction. The insulation in our PLC is designed to cope with the pollution level 2, so use in an environment with pollustion level 2 or below.

Pollution level 1 : An environment where the air is dry and conductive dust does not exist.

Pollution level 2 : An environment where conductive dust does not usually exist, but occasional temporary conductivity occurs due to the accumulated dust. Generally, this is the level for inside the control box equivalent to IP54 in a control room or on the floor of a typical factory.

Pollution level 3 : An environment where conductive dust exits and conductivity may be generated due to the accumulated dust.
An environment for a typical factory floor.

Pollution level 4 : Continuous conductivity may occur due to rain, snow, etc. An outdoor environment.

As shown above, the PC can realize the pollution level 2 when stored in a control cabinet equivalent to IP54.

3.2.5 Module installation

(1) Installing modules contiguously
In A series PCs, the left side of each I/O module is left open. When installing an I/O module to the base, do not make any open slots between any two modules. If there is an open slot on the left side of a module with 100/200VAC rating, the printed board which contains the hazardous voltage circuit becomes bare. When it is unavoidable to leave an open slot, be sure to install the blank module (AG60).
When using the A5□B expansion base with no power supply, attach the cover packaged with the expansion base to the side of the leftmost module.

3.2.6 Grounding

There are two kinds of grounding terminals as shown below. Either grounding terminal must be used grounded.

Be sure to ground the protective grounding for the safety reasons.
Protective grounding ⏚ : Maintains the safety of the PC and improves the noise resistance.
Functional grounding ⏚ : Improves the noise resistance.

3.2.7 External wiring

(1) 24VDC external power supply
For special modules that require a 24 V DC I/O module or external power supply, use a model whose 24 V DC circuit is intensively insulated from the hazardous voltage circuit.

(2) External devices
When a device with a hazardous voltage circuit is externally connected to the PLC, use a model whose circuit section of the interface to the PLC is intensively insulated from the hazardous voltage circuit.

(3) Insulation requirements
Voltages are shown in Table 2.

Table 2 : Intensive Insulation Withstand Voltage
(Installation Category II, source : IEC664)

Rated voltage of hazardous voltage area	Surge withstand voltage (1.2/50μs)
150VAC or below	2500V
300VAC or below	4000V

4.1 Installing Modules

4.1.1 Precautions for handling of modules

This section describes the precautions that must be taken when handling the CPU, I/O modules, special function modules, power supply module, base units, etc.

(1) Module enclosure, memory cassette, terminal block connectors and pin connectors are made of resin; do not drop them or subject them to strong impact.

(2) Do not remove modules' printed circuit boards from the plastic casing.

(3) During wiring, take care to ensure that wiring off cuts, etc. do not get inside the case.

If anything does get inside the case, remove it.

(4) Tighten the module mounting (unnecessary in normal operating condition) and terminal block screws as indicated below.

Screw	Tightening Torque N·cm
Module mounting screws (M4 screw) (optional)	78 to 118
Terminal block screws	98 to 137

(5) To install a module, push it firmly into the base unit so that the latch engages properly. To remove a module, press the latch to disengage it from the base unit, then pull the module out (for details, refer to the relevant PC CPU User's Manual.

4.1.2 Installation environment

The CPU system should not be installed under the following environmental conditions:

(1) Places where ambient temperature is outside of 0 to 55°C range.

(2) Places where ambient humidity is outside of 10 to 90%RH range.

(3) Places where dewing (condensation) occurs due to sudden temperature changes.

(4) Places where corrosive or inflammable gas exists.

(5) Places where a large amount of dust, iron powder and other conductive powder, oil mist, salt or organic solvent exists.

(6) Places exposed to direct sunlight.

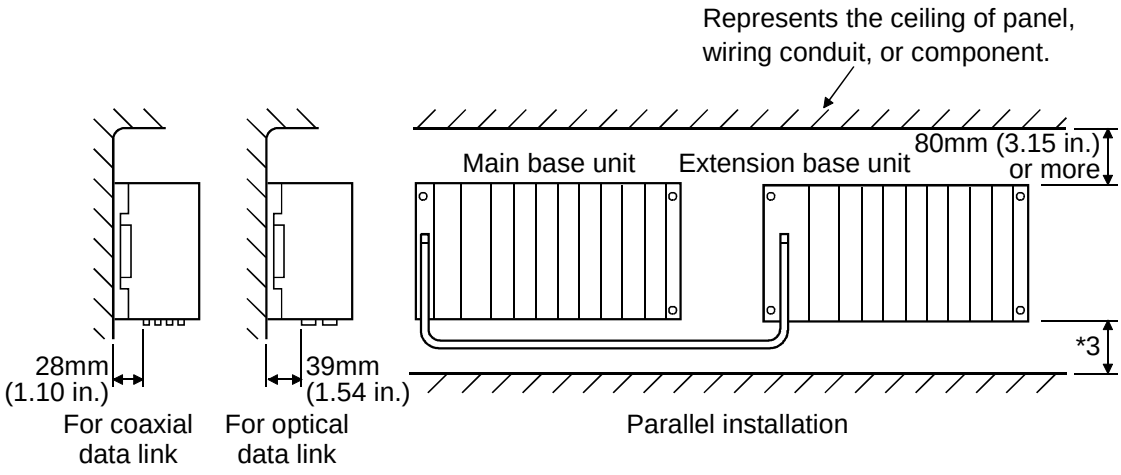
(7) Places where a strong electric or magnetic field exists.

(8) Places where mechanical vibrations or impacts are transmitted directly to the module body.

4.1.3 Precautions relating to the installation of the base unit

The following precautions must be observed when installing a PC to an operation panel or other bases considering fully the operability, maintainability, and resistance to the environment.

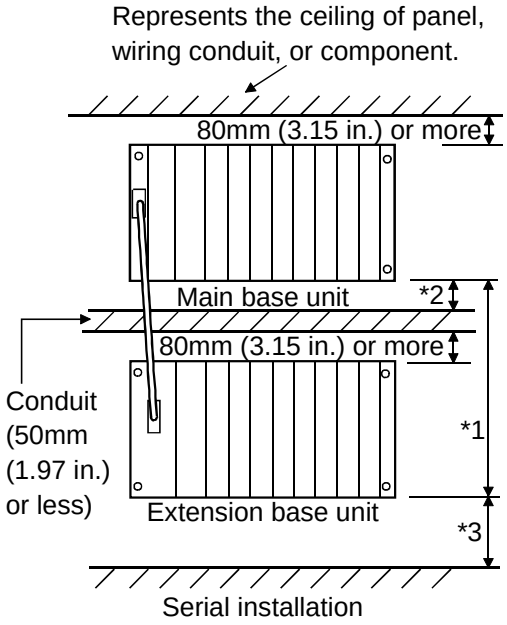
(1) Unit mounting position
To ensure proper ventilation and make module replacement easy, provide a clearance of 80mm (3.15in.) or more between the top of the unit and any surrounding structure or equipment.



(2) A wiring conduit should be provided if required.
If its clearance above or below the programmable controller is less than indicated in the figure above, observe the following points:

(a) If the wiring conduit is installed above the programmable controller, its height must be no greater than 50 mm (1.97in.) to ensure good ventilation.
In addition, there should be adequate space between the programmable controller and the wiring conduit to allow module latches to be pressed.
It will not be possible to replace modules if their latches cannot be pressed.

(b) If the wiring conduit is installed below the programmable controller, it should be installed so as to allow connection of the optical fiber cable or coaxial cable, taking the minimum bending radius of the cable into consideration.



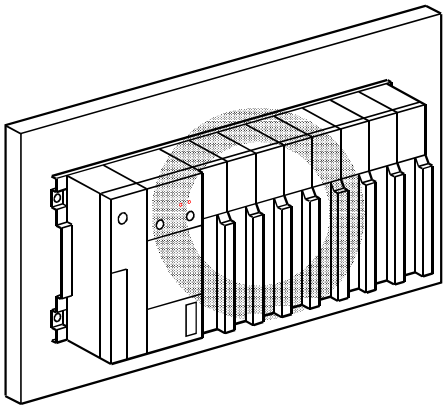
*1 : These dimensions vary depending on the length of the extension cable as follows:
AC06B cable .....450mm (17.71in.) or less
AC12B cable .....1050mm (41.34in.) or less
AC30B cable .....2850mm (112.20in.) or less

*2 : When a link module is not used .....50mm (1.97in.) or more
When using ϕ4.5mm optical fiber cable,
or coaxial cable .....100mm (3.94in.) or more
When using ϕ8.5mm optical fiber cable.....130mm (5.12in.) or more

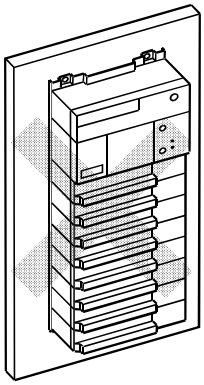
*3 : When a link module is not used .....50mm (1.97in.) or more
When using ϕ4.5mm optical fiber cable,
or coaxial cable .....100mm (3.94in.) or more
When using ϕ8.5mm optical fiber cable.....130mm (5.12in.) or more

(3) Unit mounting orientation

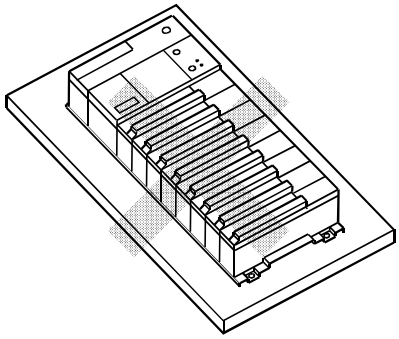
(a) Since the PC generates heat, mount it in a well-ventilated location and in the orientation shown below.



(b) Do not mount it in either of the orientations shown below.



Vertical



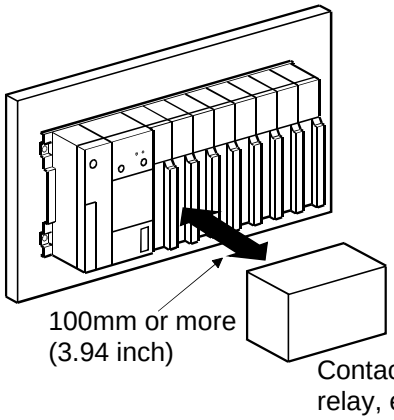
Flat

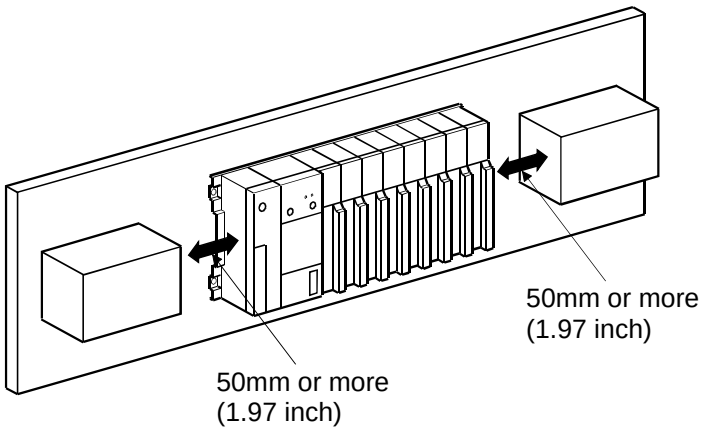
(4) Mount base units on a flat surface.
If the mounting surface is uneven, this may strain the printed circuit boards and cause malfunctions.

(5) Avoid mounting the base unit in proximity to vibration sources such as large magnetic contactors and no-fuse circuit breakers; mount these on a separate panel or at a distance.

(6) In order to avoid the effects of radiated noise and heat, provide the clearances indicated below between the PC and devices that generate noise or heat (contactors and relays).

- Required clearance in front of.....100mm or more (3.94inch)
- Required clearance on the right and left of .....50mm or more (1.97inch)





4.2 The view of a Fail-safe Circuit

When the programmable controller is switched ON/OFF, the outputs may temporarily be incorrect due to the delay time and difference between the start-up time of the programmable controller's power supply and that of the external power supply for process control (especially if it is DC).
For example, if the power to the PC is turned ON after turning ON the external power supply used for the process control with the DC output module, the DC output module may make an erroneous output for an instant.
There is a possibility of abnormal operation if the external power supply is abnormal or a programmable controller fault occurs.
To prevent the abnormal operation of the whole system, machine breakdown, and accidents, build a fail-safe circuit (emergency stop, protective circuit, interlocking circuit, etc.) outside the PC.

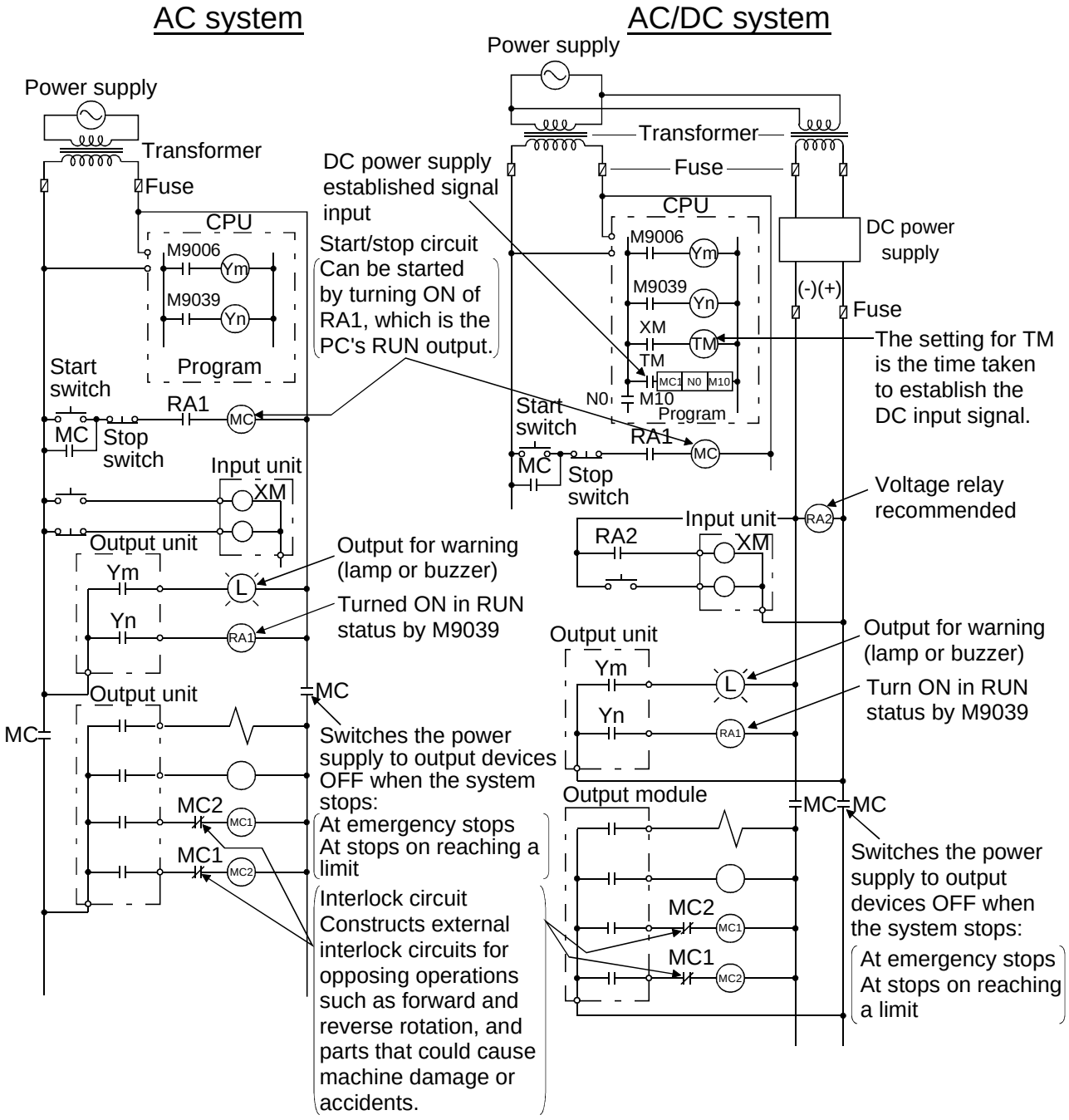
The next page shows an example of the system design circuits, based on the considerations described above.

DANGER

- Install a safety circuit external to the PC that keeps the entire system safe even when there are problems with the external power supply or the PC module. Otherwise, trouble could result from erroneous output or erroneous operation.
  (1) Outside the PC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, positioning upper and lower limits switches and interlocking forward /reverse operations.
  (2) When the PC detects the following problems, it will stop calculation and turn off all output.
  - The power supply module has over current protection equipment and over voltage protection equipment.
  - The PC CPUs self-diagnostic functions, such as the watchdog timer error, detect problems. In addition, all output will be turned on when there are problems that the PC CPU cannot detect, such as in the I/O controller. Build a fail safe circuit exterior to the PC that will make sure the equipment operates safely at such times. See Section 4.2 of this user's manual for example fail safe circuits.

  See this user's manual for example fail safe circuits.
  (3) Output could be left on or off when there is trouble in the outputs module relay or transistor. So build an external monitoring circuit that will monitor any single outputs that could cause serious trouble.
- Build a circuit that turns on the external power supply when the PC main module power is turned on. If the external power supply is turned on first, it could result in erroneous output or erroneous operation.

(1) System design circuit example



The procedures used to switch on the power supply are indicated below.

AC system

[1] Switch the power supply ON.
[2] Set the CPU module to RUN.
[3] Switch the start switch ON.
[4] The output devices are driven in accordance with the program when the magnetic contactor (MC) comes ON.

AC/DC system

[1] Switch the power supply ON.
[2] Set the CPU module to RUN.
[3] Switch RA2 ON when the DC power supply starts.
[4] Switch the timer (TM) ON when the DC power supply reaches working voltage.
(The set value for TM must be the time it takes for 100% establishment of the DC power after RA2 is switched ON. Make this set value 0.5 seconds.)
[5] Switch the start switch ON.
[6] The output devices are driven in accord-ance with the program when the magnetic contactor (MC) comes ON.
(If a voltage relay is used at RA2, no timer (TM) is necessary in the program.)

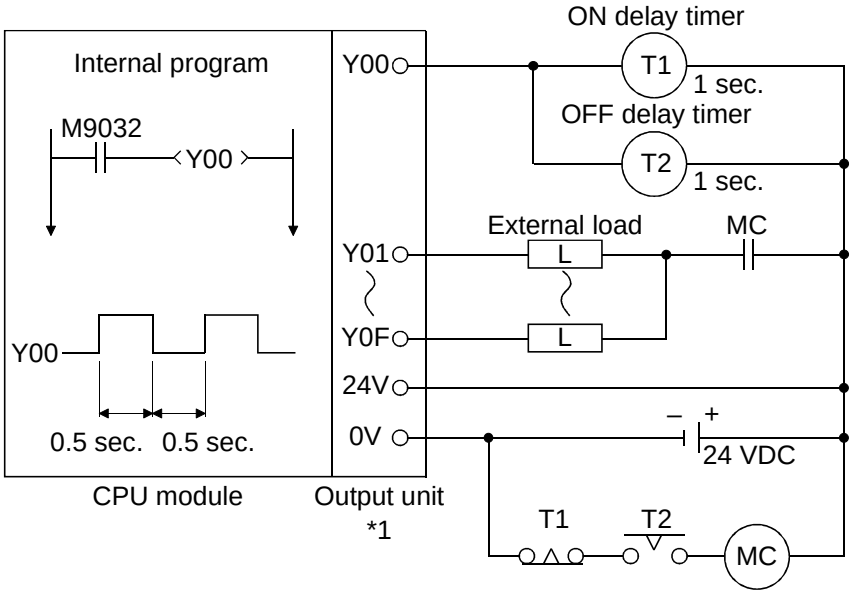
(2) Fail-safe measures to cover the possibility of PC failure

Problems with a CPU or memory can be detected by the self diagnosis function. However, problems with I/O control area may not be detected by the CPU.

In such cases, all I/O points turn ON or OFF depending on a condition of problem, and normal operating conditions and operating safety cannot sometimes be maintained.

Though Mitsubishi PCs are manufactured under strict quality control, they may cause failure or abnormal operations due to unspecified reasons. To prevent abnormal operations of whole system, machine breakdown, and accidents, build a fail-safe circuit outside the PC.

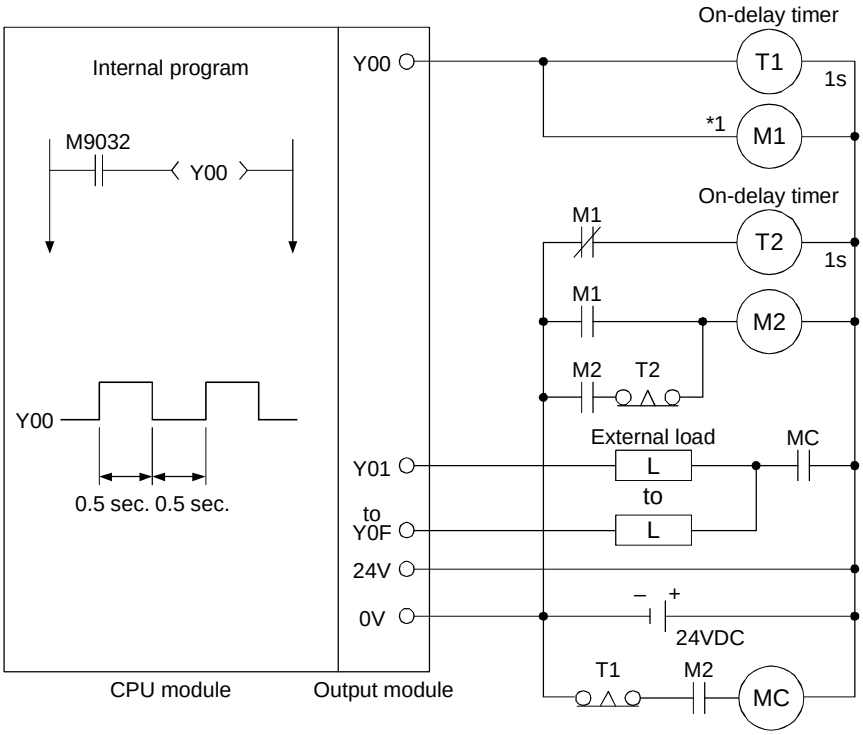
The following gives an example of a fail-safe circuit.



*1 Since Y00 alternates between ON and OFF at 0.5 second intervals, use a contactless output module (in the above example this is a transistor).

*2 If an OFF delay timer (especially a miniature timer) is not available, use ON delay timers to make a fail-safe circuit as shown below.

A fail-safe circuit built with ON delay timers



4.3 Power Supply Connection

4.3.1 Performance Specification for Power Supply Modules

(1) Normal power supply module

Table 4.1 Power Supply Module Specifications

Item		Specifications					
		A61P	**A62P**	**A63P**	**A65P**	**A66P**	**A67P**
Base unit loading position		Power supply module loading slot				I/O module loading slot	Power supply module loading slot
Input voltage		100-120 VAC +10% -15% (85 to 132 VAC)		24VDC +30% -35% (15.6 to 31.2 VDC)	100-120 VAC +10% -15% (85 to132 VAC)		110 VDC (85 to 140 VDC)
		200-240 VAC +10 % -15 % (170 to 264 VAC)			200-240 VAC +10 % -15 % (170 to 264 VAC)		
Input frequency		50/60 Hz ±5 %		—	50/60 Hz ±5 %		—
Input voltage distortion factor.		Within 5% (See Section 4.4)					
Max. input apparent power		110 VA		65 W	110 VA	95 VA	65 W
Inrush current		20 A, within 8 ms		100 A, within 1 ms	20 A, within 8 ms		
Rated output current	5 VDC	8 A	5 A	8 A	2 A	—	8 A
	24 VDC	—	0.8 A	—	1.5 A	1.2 A	—
*1 Overcurrent protection	5 VDC	8.8 A or higher	5.5 A or higher	8.5 A or higher	2.2 A or higher	—	8.5 A or higher
	24 VDC	—	1.2 A or higher	—	2.3 A or higher	1.7 A or higher	—
*2 Overvoltage protection	5 VDC	5.5 to 6.5 V	5.5 to 6.5 V	5.5 to 6.5 V	5.5 to 6.5 V	—	5.5 to 6.5 V
	24 VDC	—					
Efficiency		65 % or higher					
Withstanding voltage		1500 VAC for 1 minute between all AC external terminals together and ground 500 VAC for 1 minute between all DC external terminals together and ground					
Noise durability		Noise voltage 1500 V.P.P.		Noise voltage 500 V.P.P.	Noise voltage 1500 V.P.P.		Noise voltage 500 V.P.P.
Insulation resistance		10 MΩ or higher, measured with a 500 VDC insulation resistance tester					
Power indicator		Power LED display					
Terminal screw size		M4 × 0.7 × 6				M3 × 0.5 × 6	M4 × 0.7 × 6

Table 4.1 Power Supply Module Specifications

Item	Specifications					
	A61P	**A62P**	**A63P**	**A65P**	**A66P**	**A67P**
Applicable wire size	0.75 to 2 mm^2					
Applicable solderless terminal	V1.25-4,V1.25-YS4A,V2-S4,V2-YS4A				V1.25-3, V1.25-YS 3A V2-S3, V2-YS3A	V1.25-4, V1.25-YS 4A, V2-S4, V2-YS4A
Applicable tightening torque: N・cm	118				69	118
External dimensions mm (inch)	250 (H) × 55 (W)× 121 (D) (9.8× 2.1× 4.7)				250 (H) × 37.5 (W)× 121 (D) (9.8× 1.5× 4.7)	250 (H) × 55 (W)× 121 (D) (9.8× 2.1× 4.7)
Weight kg	0.98	0.94	0.8	0.94	0.75	0.8
Allowable momentary power interruption time *3	Less than 20ms		Less than 1ms	Less than 20ms	——	Less than 20ms (at 100 VDC)

REMARK

The A66P module has the number of occupied slots shown below.1 slot

(2) Power supply module for CE marking

Table 4.2 Power Supply Module Specifications

Item		Specifications	
		A61PEU	**A62PEU**
Base unit loading position		Power supply module loading slot	
Input voltage		100-120 / 200-240 VAC +10% -15% (85 to 264 VAC)	
Input frequency		50/60 Hz ±5 %	
Input voltage distortion factor.		Within 5% (See Section 4.4)	
Max. input apparent power		130 VA	155 VA
Inrush current		20 A, within 8 ms	
Rated output current	5 VDC	8 A	5 A
	24 VDC	—	0.8 A
Overcurrent protection *1	5 VDC	8.8 A or higher	5.5 A or higher
	24 VDC	—	1.2 A or higher
Overvoltage protection *2	5 VDC	5.5 to 6.5 V	—
	24 VDC	—	
Efficiency		65 % or higher	
Withstanding voltage		2830 VAC	
Noise durability		Noise voltage IEC801-4; 2kV, 1500 V.p.p	
Insulation resistance		10 MΩ or higher, measured with a 500 VDC insulation resistance tester	
Power indicator		Power LED display	
Terminal screw size		M4 × 0.7 × 6	
Applicable wire size		0.75 to 2 mm^2	
Applicable solderless terminal		RAV1.25-4, RAV2-4	
Applicable tightening torque		118 N・cm	
External dimensions mm (inch)		250 (H) × 55 (W)× 121 (D) (9.8× 2.1× 4.7)	
Weight kg		0.8	0.9
Allowable momentary power interruption time *3		Less than 20ms	

POINTS

*1 : Overcurrent protection

(a) The overcurrent protection device shuts off the 5VDC, 24VDC ladder and stops the system if the current flowing in the ladder exceeds the specified value.
When this device is activated, the power supply module LED is switched off or dimly lit.

(b) If this happens, eliminate the cause of the overcurrent — for example insufficient current capacity or short ladder — then start up the system.
When the current has returned to normal, the system undergoes an initial start.

*2 : Overvoltage protection

The overboltage protection device shuts off the 5 VDC ladder and stops the system if an excessive voltage in the range 5.5 to 6.5V is applied to this ladder.
When this device is activated, the power supply module LED is switched off. If this happens, switch the input power OFF, then back ON to restart the system.
If the system is not booted and the LED remains off, the power supply module must be changed.

*3 : Allowable momentary power interruption time

The PC CPU allowable momentary power interruption time varies according to the type of power supply module.
In the case of the A63P module, the allowable momentary power interruption time is defined as from when the 24VDC stabilized primary supply is cut off until the 24VDC voltage drops to the defined voltage (15.6VDC).

4.3.2 Part identification and setting of Power Supply Module

The names and descriptions of each of the parts of the power supply modules are given below.

(1) Names and description of parts of the A61P, A61PEU module

Module fixing hook
Hook for fixing the module to the base unit.

"POWER" LED
LED for indicating 5 VDC power.

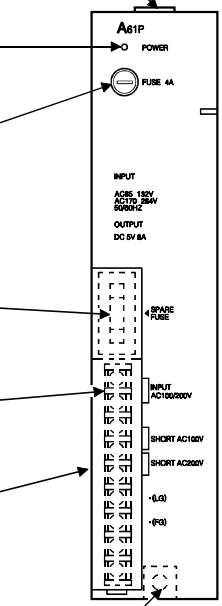
Power fuse, fuse holder
4 A cartridge fuse for AC input power is secured by the fuse holder.

Spare fuse for power supply
Spare fuse for power supply, mounted on rear side of the terminal cover.

Terminal block
For details, see below. (Located under the terminal cover)

Terminal cover
Cover for protection of terminal block. Remove during wiring. Re-install after wiring.

Module fixing screw mounting hole
Allows the module to be secured with a screw in addition to the module fixing hook. (For M4 screw)



Terminal details

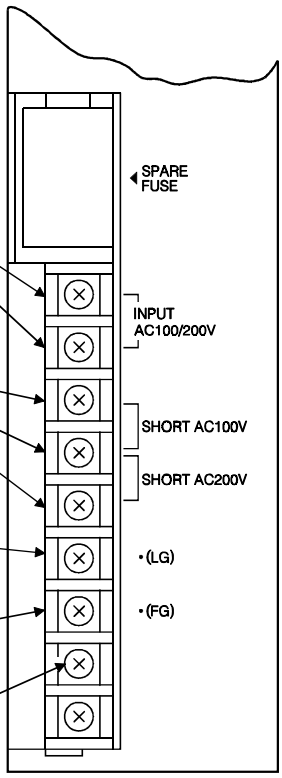
Power input terminals
Power input terminals to which AC power of 100 VAC or 200 VAC.

Applied voltage select terminals
Terminals for selecting applied voltage. Use 100 VAC or 200 VAC as described below. When 100 VAC is input, connect together the "SHORT AC100V" terminals with the jumper provided. When 200 VAC is input, connect together the "SHORT AC200V" terminals with the jumper provided.

LG terminal
Grounding of power filter. Has half the input potential.

FG terminal
Connection terminal connected to the shielding pattern on printed circuit board.

Terminal screw
M4 × 0.7 × 6



(2) Names and description of parts of the A62P, A62PEU and A65P modules

Module fixing hook

Hook for fixing the module to the base unit.

"POWER" LED

LED for indicating 5 VDC power.

Power fuse, fuse holder

4 A cartridge fuse for AC input power is secured by the fuse holder.

Spare fuse for power supply

Spare fuse for power supply, mounted on rear side of the terminal cover.

Terminal block

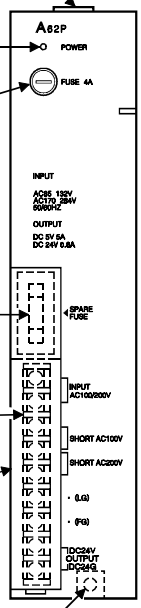
For details, see below. (Located under the terminal cover)

Terminal cover

Cover for protection of terminal block. Remove during wiring. Re-install after wiring.

Module fixing screw mounting hole

Allows the module to be secured with a screw in addition to the module fixing hook. (For M4 screw)



Terminal details

Power input terminals

Power input terminals to which AC power of 100 VAC or 200 VAC.

Applied voltage select terminals

Terminals for selecting applied voltage. Use 100 VAC or 200 VAC as described below. When 100 VAC is input, connect together the "SHORT AC100V" terminals with the jumper provided. When 200 VAC is input, connect together the "SHORT AC200V" terminals with the jumper provided.

LG terminal

Grounding of power filter. Has half the input potential.

FG terminal

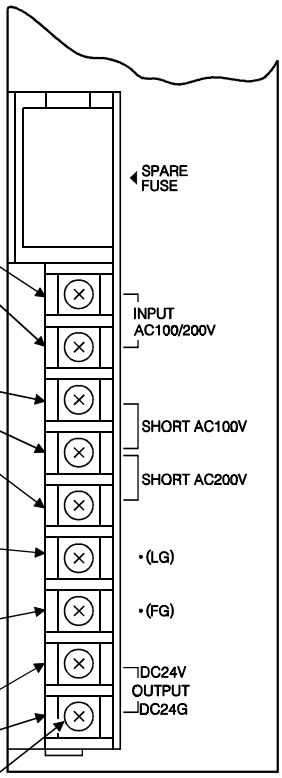
Connection terminal connected to the shielding pattern on printed circuit board.

24 VDC, 24 GDC terminals

For supply to output module which requires 24 V inside the module. (Supplied to the module via external wiring)

Terminal screw

M4 × 0.7 × 6



(3) Names and description of parts of the A63P and A67P modules

Module fixing hook

Hook for fixing the module to the base unit.

"POWER" LED

LED for indicating 5 VDC power.

Power fuse, fuse holder

Cartridge fuse for DC input power is fixed by the fuse holder.
The rating for the fuses are as follows.
A63P: 6.3 A (SM6.3 A)
A67P: 4 A (GTH4)

Spare fuse for power supply

Spare fuse for power supply, mounted on rear side of the terminal cover.

Terminal block

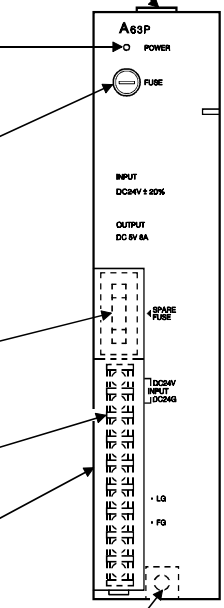
For details, see below. (Located under the terminal cover)

Terminal cover

Cover for protection of terminal block. Remove during wiring. Re-install after wiring.

Module fixing screw mounting hole

Allows the module to be secured with a screw in addition to the module fixing hook. (For M4 screw)



Terminal details

Power input terminals

Power input terminals for A63P: 24 VDC, A67P: 100 VDC.
The power fuse will be blown if the 24 VDC connection is made with the wrong polarity.

LG terminal

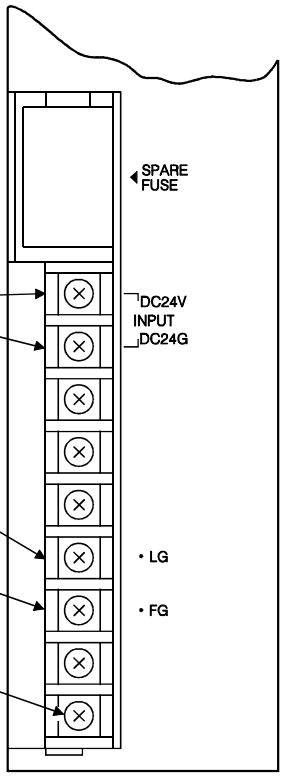
Grounding of power filter.

FG terminal

Connection terminal connected to the shielding pattern on printed circuit board.

Terminal screw

M4 × 0.7 × 6



(4) Names and description of parts of the A66P module

Module fixing hook

Hook for fixing the module to the base unit.

"POWER" LED

LED for indicating 5 VDC power.

Power fuse, fuse holder

4 A cartridge fuse for AC input power is secured by the fuse holder.

Terminal block fixing screw

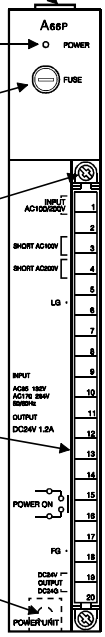
Screw for installing and fixing the terminal block to the module.

Terminal block

For details, see below. (Located under the terminal cover)

Module fixing screw mounting hole

Allows the module to be secured with a screw in addition to the module fixing hook. (For M4 screw)



Terminal details

Power input terminals

Power input terminals to which AC power of 100 VAC or 200 VAC.

Applied voltage select terminals

Terminals for selecting applied voltage. Use 100 VAC or 200 VAC as described below. When 100 VAC is input, connect together the "SHORT AC100V" terminals with the jumper provided. When 200 VAC is input, connect together the "SHORT AC200V" terminals with the jumper provided.

LG terminal

Grounding of power filter. Has half the input potential.

Power ON terminal

Contact terminal which conducts if the 24 VDC output is normal when power input turns on.

FG terminal

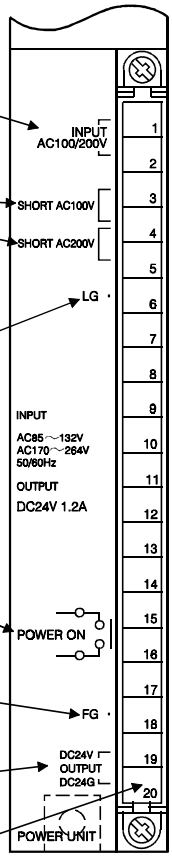
Connection terminal connected to the shielding pattern on printed circuit board.

24 VDC, 24 GDC terminals

For supply to output module which requires 24 V inside the module. (Supplied to the module via external wiring)

Terminal screw

M3 × 0.5 × 6



(5) Setting

For A61P, A61PEU, A62P, A62PEU, A65P or A66P, the input voltage range, 100V or 200V, must be specified by placing a jumper (supplied) across two terminals as described below:

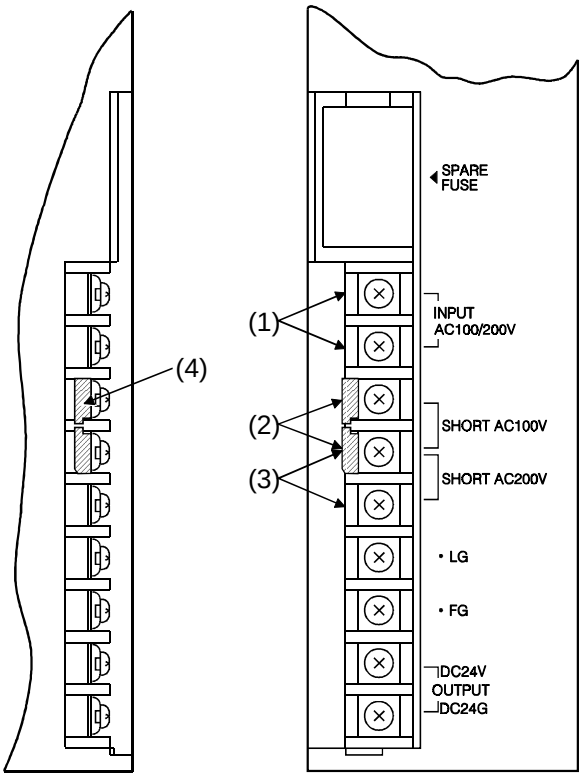
Remove the terminal cover from the power supply module.

↓

Remove the pair of terminal screw, (2) or (3), according to the supply voltage range (1) used.
(2): For the 100 VAC range.
(3): For the 200 VAC range.

↓

Fit the jumper (4) and secure it with the terminal screw.
Fit the jumper in the direction shown in the figure at right.
(The figure at right shows an example when the supply line voltage is 100 VAC.)



POINT

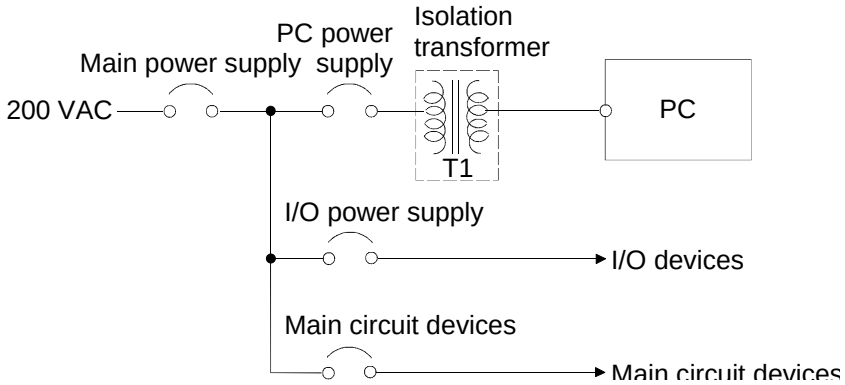
If the setting differs from the supply line voltage, the following occurs: do not mis-set.

	Supply Line Voltage	
	100VAC	**200VAC**
Setting to 100VAC (jumper fitted as indicated at (2))	—	The power supply module is damaged. (The CPU is not damaged.)
Setting to 200VAC (jumper fitted as indicated at (3))	No error occurs in the module. However, the CPU does not operate.	—
No setting (jumper not fitted)	No error occurs in the module. However, the CPU does not operate.	

4.3.3 Power Supply Connection

Observe the following precautions for power supply wiring.

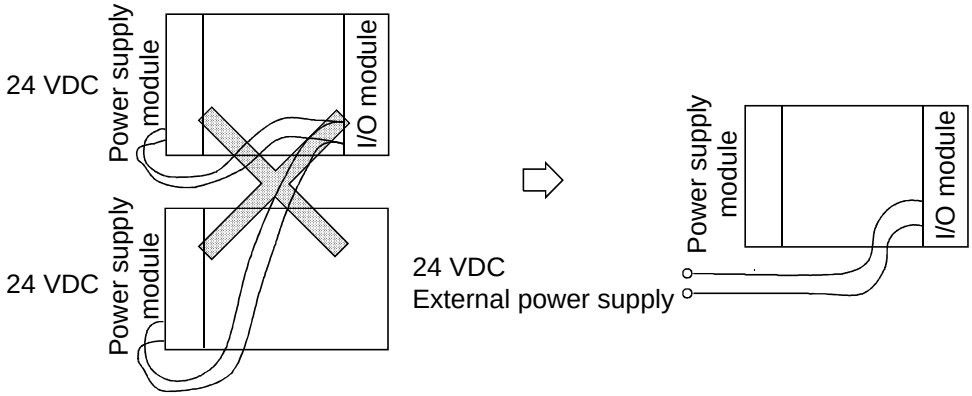
(1) Provide separate wiring systems for the PC power, I/O devices, and operating devices as shown below.
If the wiring is influenced by excessive noise, connect an isolation transformer.



REMARK

As safety measures, install a switch for use with "online I/O module change" only to each of the corresponding modules and equipment.

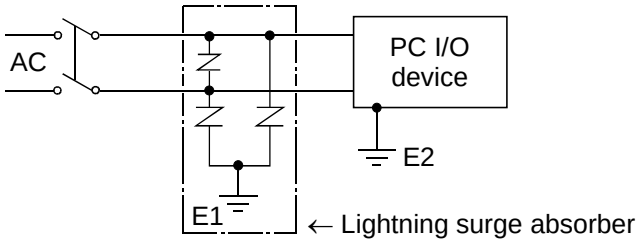
(2) Do not supply 24VDC power from more than one power supply modules in parallel to one I/O module. If they are connected in parallel, the power supply modules may fail.
If the 24VDC output capacity is insufficient for one power supply module, supply 24VDC from the external 24VDC power supply as shown below:



(3) 100VAC, 200VAC, and 24VDC wires should be twisted as tightly as possible, and connect the modules at the shortest distance between them. To minimize voltage drop, use thick wires (MAX. 2mm^2) where possible.

(4) Do not bind 100VAC and 24VDC wires together with main circuit (high tension and large current) wires or I/O signal wires nor place them near each other. Provide 100mm (3.94 inch) clearance between the wires if possible.

(5) As a measure against surges caused by lightning, insert a lightning surge absorber as shown below.

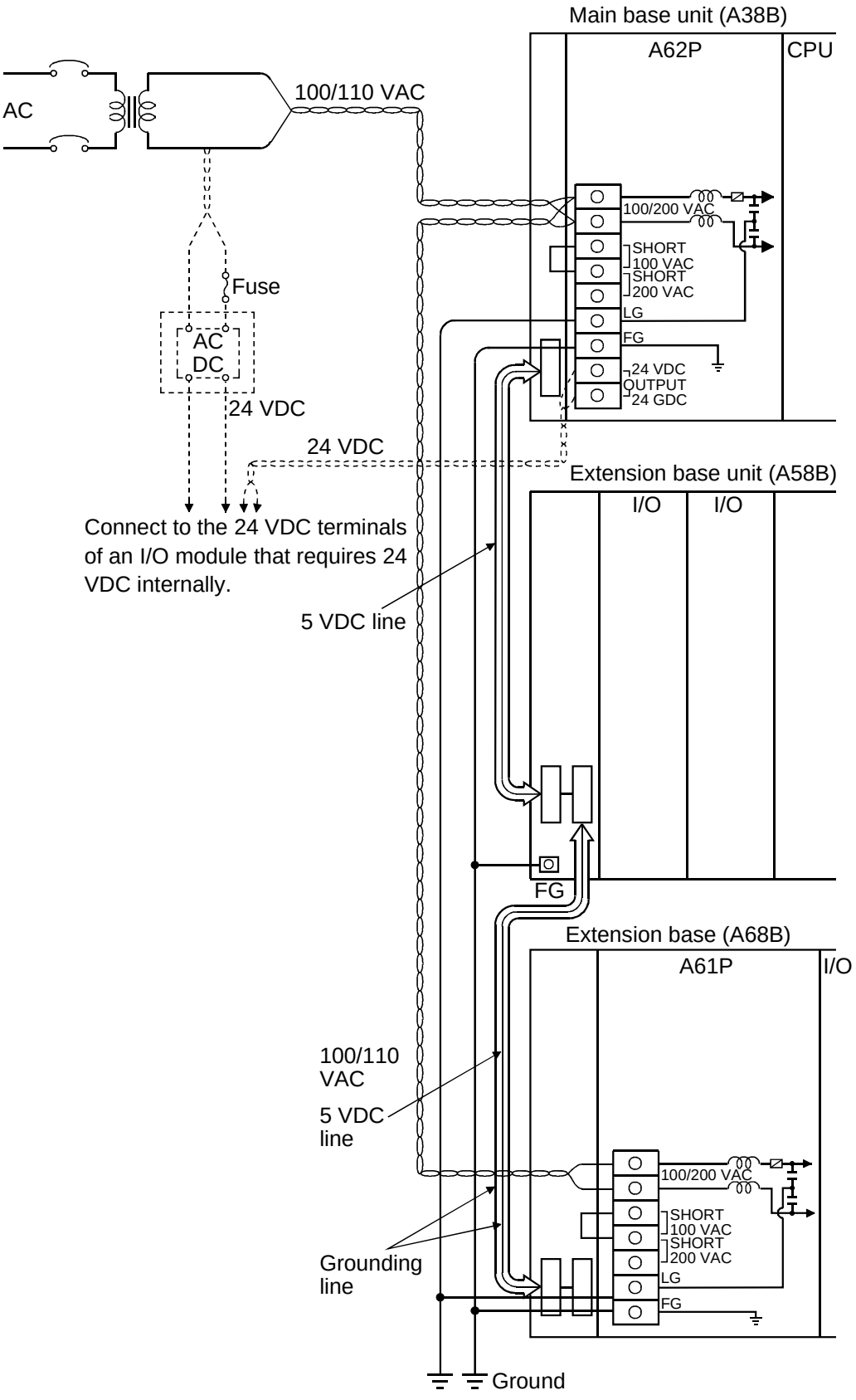


POINTS

(1) Provide separate grounding for the lightning surge absorber (E1) and the PC (E2).

(2) Select a lightning surge absorber whose maximum allowable circuit voltage is higher than the circuit voltage at the maximum power supply voltage.

(6) The following is an example of wiring of power supply and grounding wires to main base unit and extension base units.



POINTS

(1) Use thick wires (MAX. 2mm^2) possible for the 100/200VAC and 24VDC power supply, and twist the wires from connected terminals. When a solderless terminal is used, use a solderless terminal with an insulation sleeve to prevent short-circuit if the terminal screw becomes loose.

(2) When the LG and FG terminals are connected, they must be grounded. If they are not grounded, the operations will be easily influenced by noise. Be aware not to touch the LG terminal since it has potential of half the input voltage.

4.4 Precaution when Connecting the Uninterruptive Power Supply (UPS)

Be sure of the following items when connecting the ACPU system to the uninterruptive power supply (abbreviated as UPS hereafter) :

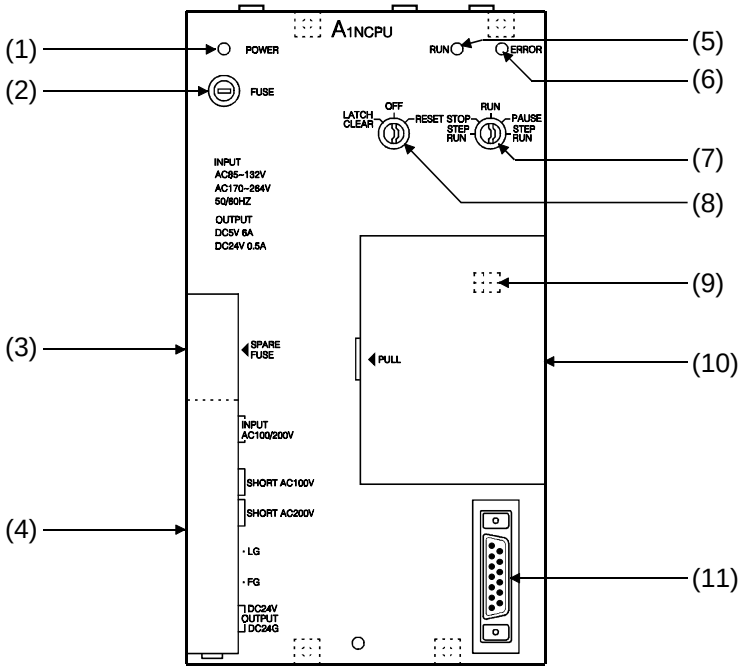
Use a UPS which employs the constant inverter power supply method with 5% or less voltage fluctuation.

Do not use a UPS with the constant commercial power supply method.

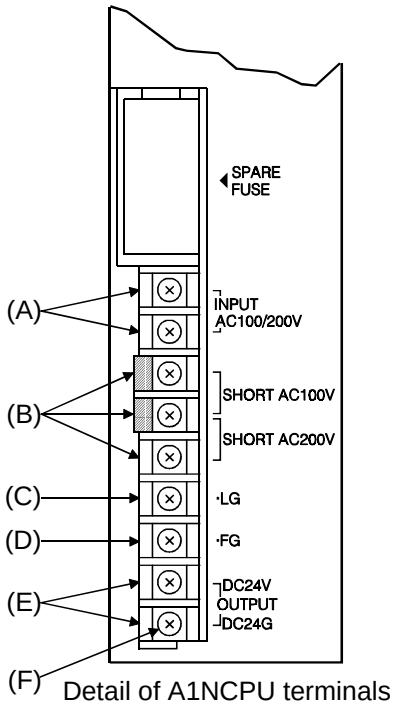
4.5 Part Identification

This section gives the names of each part of the CPU.

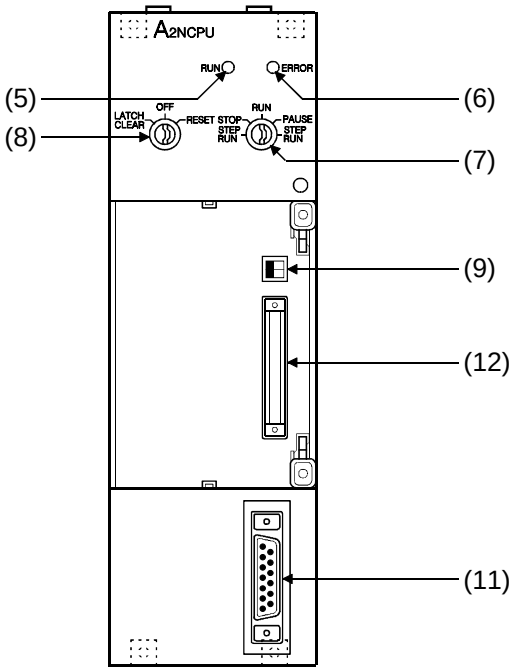
4.5.1 Part identification of AnNCPU, AnACPU, and AnUCPU



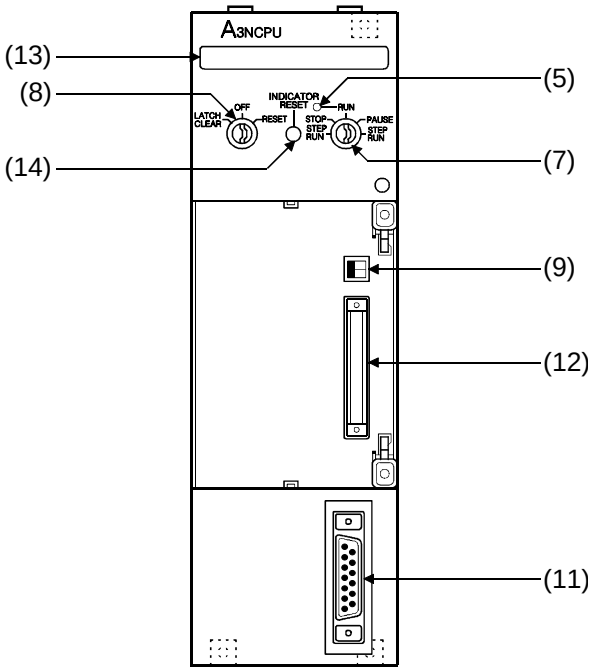
A1NCPU



Detail of A1NCPU terminals



A2NCPU(S1)
A2ACPU(S1)
A2UCPU(S1)



A3NCPU
A3ACPU
A3U, A4UCPU

(1) "POWER" LED

The "POWER" LED lights when the AC power is switched on and the 5/24 VDC output is normal.

(2) Fuse holder

Holder for the fuse that protects the AC side

(3) Spare fuse box

A spare fuse for the power supply is stored on the rear face of the cover

(4) Power terminal block

(A) Power input terminal
The power input terminal used to connect the 100VAC or 200VAC power supply.

(B) Operating voltage switching terminal
It is possible to use either a 100VAC or 200VAC power supply. When 100VAC is used, short-circuit the "SHORT 100VAC" terminals with the shorting strip supplied. When 200VAC is used, short-circuit the "SHORT 200VAC" terminals.

(C) LG terminal
Used to ground power filter.
Has potential half the input voltage.

(D) FG terminal
The grounding terminal connected to the shielding pattern on the printed wiring board.

(E) 24VDC, 24GDC terminals
Used to supply 24V to output modules that require an internal 24V source (supplied to modules through external wiring).

(F) Terminal screws
M4 x 0.7 x 6

POINT

Discrepancies between the voltage setting and the actual power supply voltage will have the following consequences:

	Power Supply Voltage	
	100VAC	**200VAC**
Set to 100VAC (shorting strip connected at (2))	—	The power supply module is destroyed (no abnormality in the CPU)
Set to 200VAC (shorting strip connected at (3))	There is no abnormality in the module. However, the CPU does not operate.	—
No setting (shorting strip not used)	There is no abnormality in the module. However, the CPU does not operate.	

(5) "RUN" LED

The "RUN" LED indicates the operating condition of the CPU.

ON : When the key switch is turned to RUN or STEP RUN and the sequence program is being executed.

OFF : When the key switch is turned to STOP, PAUSE or STEP RUN and the sequence program is not being executed.

Flashing : When an error has been detected by the self-diagnosis function (operation will continue if the error detected has been specified in the parameter settings). When the key switch is set to the LATCH CLEAR position, the LED flashes rapidly for about two seconds.

(6) "ERROR" LED

ON : Indicates that a WDT or internal fault check error has occurred due to a hardware fault.

OFF : Indicates that the annunciator (F) has been switched ON by the sequence program.

(7) RUN/STOP key switch

RUN/STOP : Used to start/stop sequence program execution.

PAUSE : Sequence program operation stops with the output statuses immediately before the PAUSE condition was established retained.

STEP RUN : The sequence program is run step by step or scan by scan.

(8) RESET key switch

RESET : Hardware reset. Used to reset the CPU after an operation error and to initialize operation.

LATCH CLEAR : Sets all data in the latch area defined in the parameter settings to "OFF" or "0" (valid only when the RUN/STOP key switch is turned to STOP).

Latch Clearing Method

(1) Turn the RUN/STOP switch from STOP to L.CLR several times.

(2) Clear by means of a program.

(9) I/O control switch (AnNCPU only)

This switch is used to set the Direct/Refresh mode.

Switch Setting	Input (X)	Output (Y)	D9014
 (Factory setting)	Direct mode	Direct mode	0
	Refresh mode	Direct mode	1
	Refresh mode	Refresh mode	3

POINTS

(1) Perform switch setting while the power is switched OFF.

(2) After the switches have been set, the CPU checks the status of the switches at power on or at reset. Note that if the direct mode is set for input and the refresh mode for output, the CPU will execute processing in the refresh mode for both input and output.

(3) Since a binary code corresponding to the I/O control mode is stored in special register D9014, the mode can be monitored using a peripheral device.

(10) Memory card area

This is the section where the memory card is installed and the memory protect setting is made. It is provided with a cover.

(11) RS-422 connector

The connector for peripheral device connection.
Fitted with a cover when not in use.

(12) Memory cassette loading connector

Used to connect the memory cassette to the CPU.

(13) LED Display

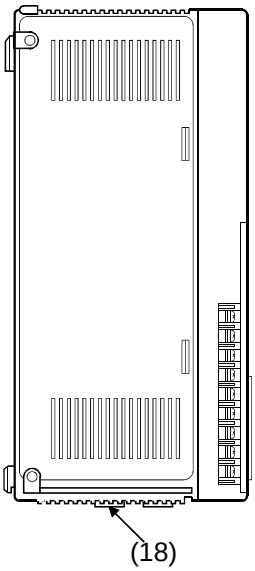
Capable of displaying up to 16 alphanumeric characters. Displays self diagnosis error comments, and the F number comments of annunciators in accordance with OUT F and SET F

(14) LED display reset switch

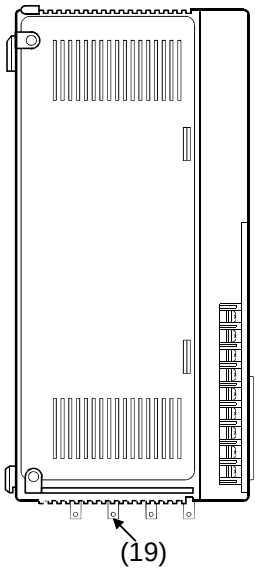
Used to clear the LED display and display the next display data if there is any.

4.5.2 Part identification of AnNCPUP21/R21, AnACPUP21/R21

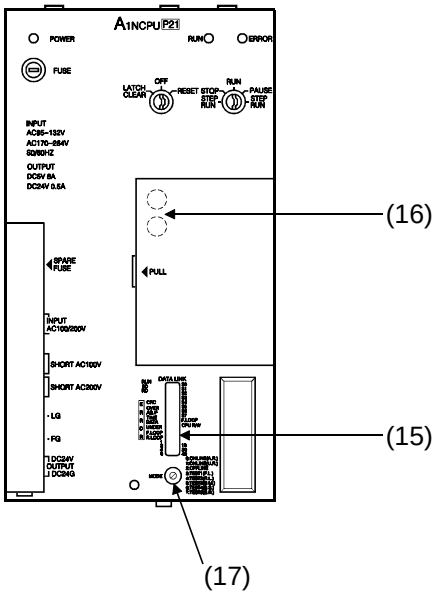
This section gives the names of those parts of the AnNCPUP21/R21 and AnACPUP21/R21 that relate to the data link function. For the names of other parts, such as the RUN/STOP key switch, refer to Section 4.5.1.

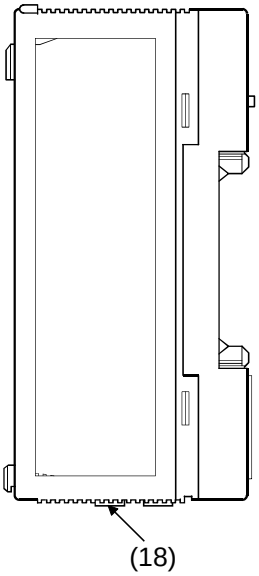


A1NCPUP21(-S3)

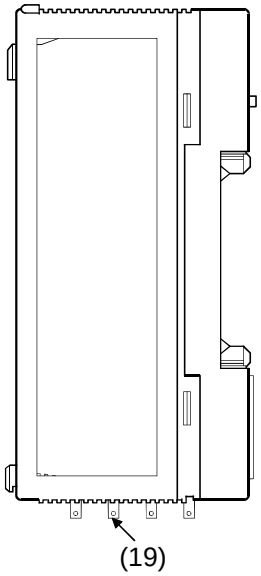


A1NCPUR21

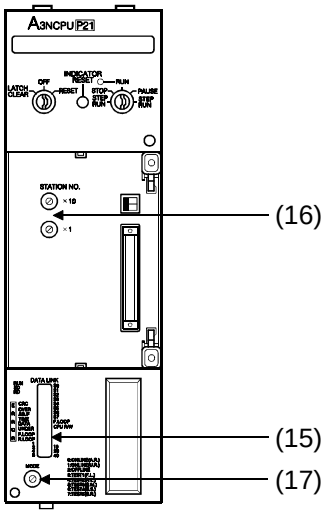




A2NCPU(S1)P21(-S4)
A3NCPUP21(-S3)
A2ACPU(S1)P21(-S4)
A3ACPUP21(-S3)



A2NCPU(S1)R21
A3NCPUR21
A2ACPU(S1)R21
A3ACPUR21



(15) LEDs for indicating operation status and errors

LED Name	Description	LED Name	Description
RUN	Comes ON when the data link is normal.	S0	Not used (These LEDs flash during execution of data link. This is not an abnormal condition)
SD	Remains ON while data is sent.	S1	
RD	Remains ON while data is received.	S2	
	Not used (always OFF)	S3	
CRC	Comes ON when a code check error occurs.	S4	
OVER	Comes ON when a data entry delay error occurs.	S5	
		S6	
AB. IF	Comes ON when data is all "1".	S7	
TIME	Comes ON when a time-out occurs.	F.LOOP	Comes ON when the forward loop serves as the data receiving line, or goes OFF when the reverse loop is used for it.
DATA	Comes ON when a receive data error occurs.		
UNDER	Comes ON when a send data error occurs.	CPU R/W	Comes ON during communications with the PC CPU.
F. LOOP	Comes ON when a forward loop receive data error occurs.		Not used (always OFF)
R.. LOOP	Comes ON when a reverse loop receive data error occurs.		Not used (always OFF)
		10	Indicate the figures at the ten's digit of the station numbers in BCD codes.
1	Indicate the figures at the one's digit of the station numbers in BCD.	20	
2		40	
4			Not used (always OFF)
8			

(16) Station number setting switches

- Station numbers from 00 to 64 can be set.
- The "X10" switch is to set the ten's digit of a station number.
- The "X1" switch is to set the one's digit of a station number.
- To use a station as the master station, set "00".
- To use a station as a local station, set between "01" and "64".

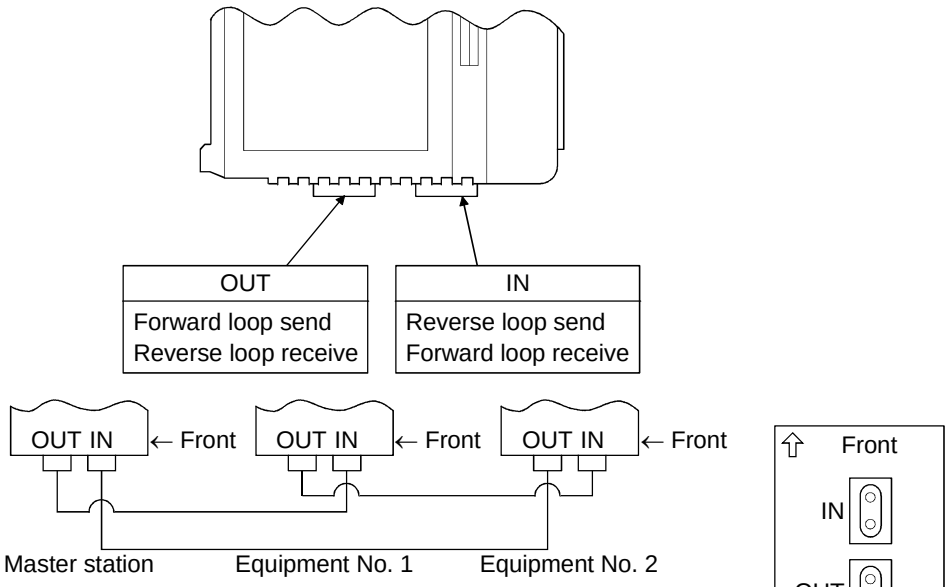
(17) Mode select switch

By switching mode, the following functions are available:

Setting Number	Name	Description
0	Online	Automatic return is set during normal operation.
1	Online	Automatic return is not set during normal operation.
2	Online	The host station is disconnected.
3	Forward loop test mode	Used to perform a line check on the optical fiber cables or coaxial cables in the forward loop (for normal data link) throughout the entire data link system.
4	Reverse loop test mode	Used to perform a line check on the optical fiber cables or coaxial cables in the reverse loop (for loopback when an error occurs) throughout the entire data link system.
5	Station-to-station test mode (master station)	Used to check the line between two stations. The line is checked with the station with the smaller station number set as the master station and the other station set as a slave station.
6	Station-to-station test mode (slave station)	
7	Self-loopback test mode	Used to check the hardware, including the send/receive circuits of the communications system, of one data link module in isolation.
8 to F	—	Unusable

(18) Connectors for connecting opeical fiber cables

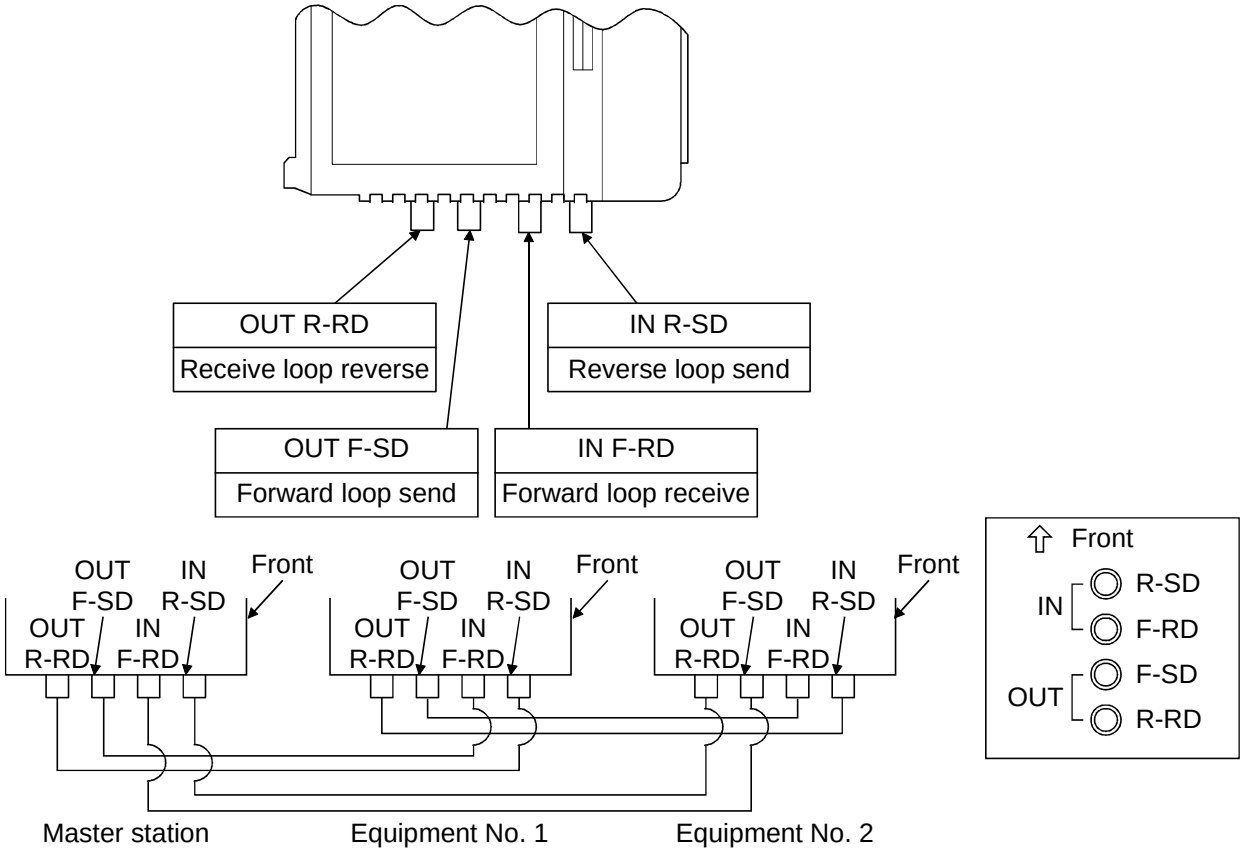
Connect the cables as illustrated below:



IN : To be connected to the OUT connector of the previous station.
OUT: To be connected to the IN connector of the next station.

(19) Connectors for connecting coaxial cables

Connect the cables as illustrated below:



IN R-SD : To be connected to the OUT R-RD connector of the previous station.
IN F-RD : To be connected to the OUT F-SD connector of the previous station.
OUT F-SD : To be connected to the IN F-RD connector of the next station.
OUT R-RD: To be connected to the IN R-SD connector of the next station.

5. I/O MODULE SPECIFICATIONS AND CONNECTIONS

This section presents the specifications and wiring drawings for each of the A series I/O modules.

5.1 Input Modules

5.1.1 Input module specifications

Model	Input Type	Number of Points/Module	Rated Input Voltage	Input Current	Operating Voltage		Maximum Simultaneous ON Input Point (Percentage Simultaneous ON)	
					ON Voltage	OFF Voltage		
AX10	AC input	16 points	100VAC	10mA	80VAC or higher	40VAC or lower	100%	
AX11		32 points					60%	
AX11EU								
AX20		16 points	200VAC		160VAC or higher	70VAC or lower	100%	
AX21		32 points					60%	
AX21EU								
AX40	DC input (sink type)	16 points	12/24 VDC	4/10mA	9.5VDC or higher	6VDC or lower	100%	
AX41		32 points					60%	
AX41-S1								
AX42 *1		64 points		3/7mA			60% *3	
AX50	DC input (sink type)	16 points	48VDC	4mA	34VDC or higher	10VDC or lower	100%	
AX50-S1	DC input (sink/source type)							
AX60	DC input (sink type)		100/110/125VDC	2mA	80VDC or higher	20VDC or lower		
AX60-S1	DC input (sink/source type)							
AX70	Sensor input (sink/source type)	16 points	5VDC (SW ON)	3.5mA (TYP) 5.5mA (MAX)	3.5VDC or higher	1.1VDC or lower	100%	
			12VDC (SW OFF)	2mA (TYP) 3mA (MAX)	5VDC or higher	2VDC or lower		
			24VDC (SW OFF)	4.5mA (TYP) 6mA (MAX)				

	Input Response Time		External Connections	Common Terminal Arrangement	Internal Current Consumption	Number of Occupied I/O Points
	OFF to ON	ON to OFF				
	15msec or less	25msec or less	20 terminal block connector	16 points/ common	0.055A	16 points
			38 terminal block connector	32 points/ common	0.11A	32 points
			20 terminal block connector	16 points/ common	0.055A	16 points
			38 terminal block connector	32 points/ common	0.11A	32 points
	10msec or less	10msec or less	20 terminal block connector	8 points/ common	0.055A	16 points
			38 terminal block connector		0.11A	32 points
			40-pin connector × 2	32 points/ common	0.12A	64 point
			20 terminal block connector	8 points/ common	0.055A	16 points
	10msec or less	20msec or less				
	1.5msec or less	3msec or less	20 terminal block connector	8 points/ common	0.055A	16 points

(To next page)

(From front page)

Model	Input Type	Number of Points/Module	Rated Input Voltage	Input Current	Operating Voltage		Maximum Simultaneous ON Input Point (Percentage Simultaneous ON)	
					ON Voltage	OFF Voltage		
AX71	Sensor input (sink/source type)	32 points	5VDC (SW ON)	3.5mA (TYP) 5.5mA (MAX)	3.5VDC or higher	1.1VDC or lower	100%	
			12VDC (SW OFF)	2mA (TYP) 3mA (MAX)	5VDC or higher	2VDC or lower		
			24VDC (SW OFF)	4.5mA (TYP) 6mA (MAX)				
AX80	DC input (source type)	16 points	12/24 VDC	4/10mA	9.5VDC or higher	6VDC or lower		
AX80E								
AX81		32 points					60%	
AX81-S1	DC input (sink/source type)		12/24 VDC	2.5/5mA	5.6VDC or higher	2.4VDC or lower		
AX81-S2	DC input (source type)		48/60 VDC	3/4mA	31VDC or higher	10VDC or lower		
AX81-S3			24VDC	4/10mA	9.5VDC or higher	6VDC or lower		
AX81B	DC input (sink/source type)	32 points	24VDC	7mA	At normal input		60%	
					21VDC or higher	6VDC or lower		
					When disconnection detected			
					1VDC or higher	6VDC or lower		
AX82 *1	DC Input (source type)	64 points	12/24 VDC	3/7mA	9.5VDC or higher	6VDC or lower	60%	
AX31	AC/DC input	32 points	12/24 VAC	8.5/4mA	7VAC/ VDC or higher	2.5VAC/ VDC or lower	100%	
			12/24 VDC					
AX31-S1	DC input (sink/source type)	32 points	24VAC	8.5mA	16VDC or higher	8VDC or lower		

	Input Response Time		External Connections	Common Terminal Arrangement	Internal Current Consumption	Number of Occupied I/O Points
	OFF to ON	ON to OFF				
	1.5msec or less	3msec or less	38 terminal block connector	8points/ common	0.11A	32 points
	10msec or less	10msec or less	20 terminal block connector		0.055A	16 points
	[TYP] 5.5msec	6.0msec				
	[High-speed mode] 0.5msec or less	1.0msec or less				
	10msec or less	10msec or less	38 terminal block connector			32 points
	0.1msec or less	0.1msec or less			0.11A	
	10msec or less	10msec or less	38 terminal block connector	8 points/ common	0.125A	64 points
	10msec or less	10msec or less	37-pin D subconnector × 2	32 points/ common	0.12A	64 points
	25msec or less	20msec or less	38 terminal block connector		0.11A	32 points
	20msec or less					
	10msec or less	10msec or less				

The following specifications apply to all modules:

Isolation method : Photocoupler
Input indication : LEDs

*1 : The ON/OFF status of the first or latter half is indicated by the LEDs in accordance with the setting of the selector switch on the front panel of the module:
FH setting: First half (X00 to X1F), LH setting: Latter half (X20 to X3F)

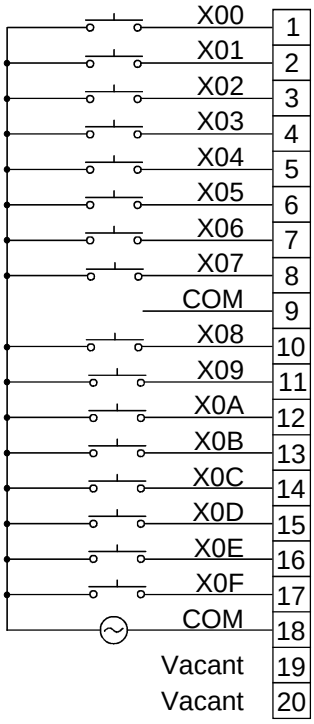
*2 : It is possible to select high speed or low speed for the upper eight points only using the DIP switch:
HIGH setting: high-speed, LOW setting: low-speed

*3: The number of simultaneous input points is 40% (13 inputs/common) simultaneously ON when the unit is used adjacent to the power supply module.

5.1.2 Input module connections

(1)

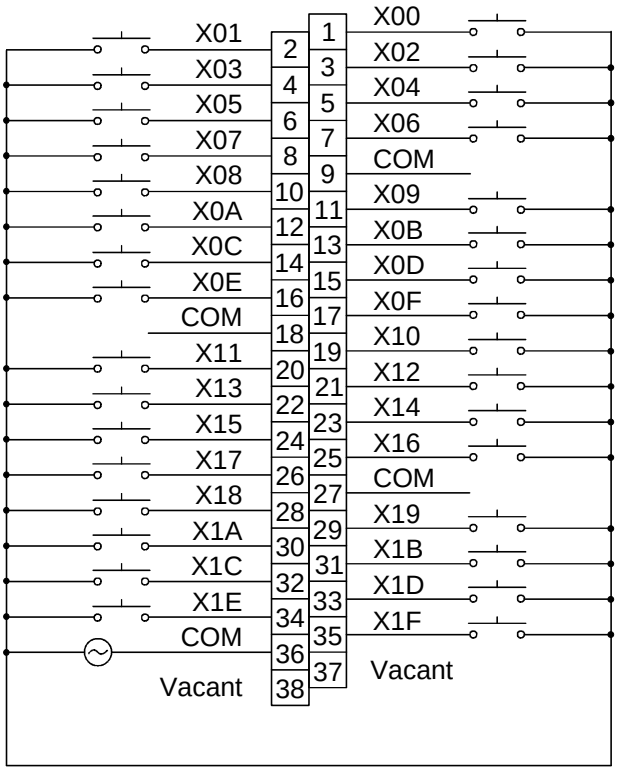
Model	Rated Input Voltage
AX10	100-120 VAC
AX20	200-240 VAC



* 9 and 18 are connected internally.

(2)

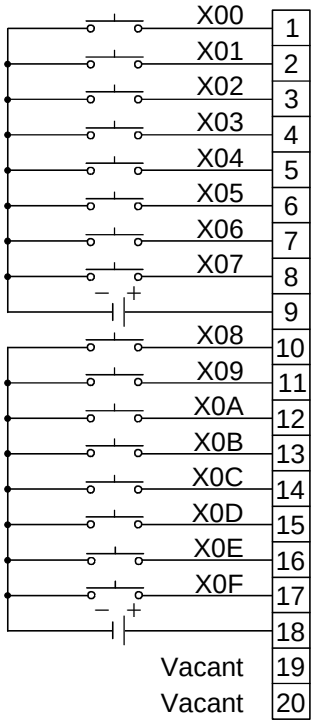
Model	Rated Input Voltage
AX11	100-120 VAC
AX21	200-240 VAC



* 9 and 18 , and 27 and 36 are connected internally.

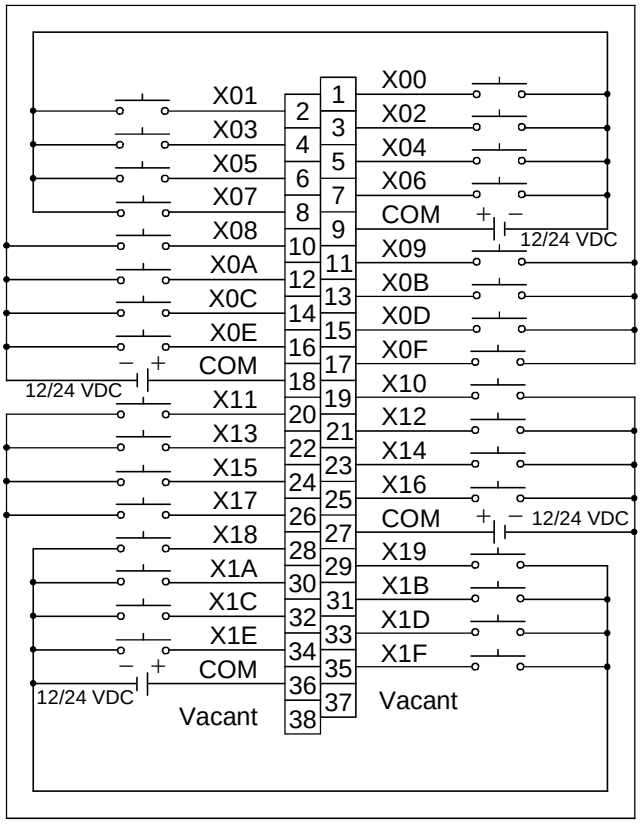
(3)

Model	Rated Input Voltage
AX40	12/24 VDC
AX50	48 VDC

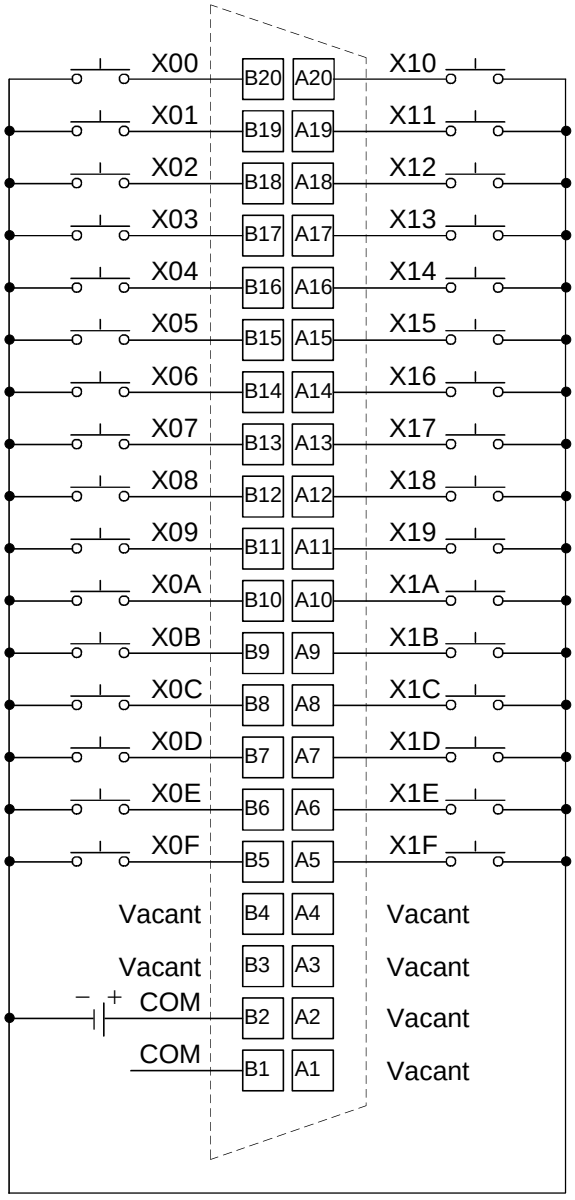


(4)

Model	Rated Input Voltage
AX41	12/24 VDC



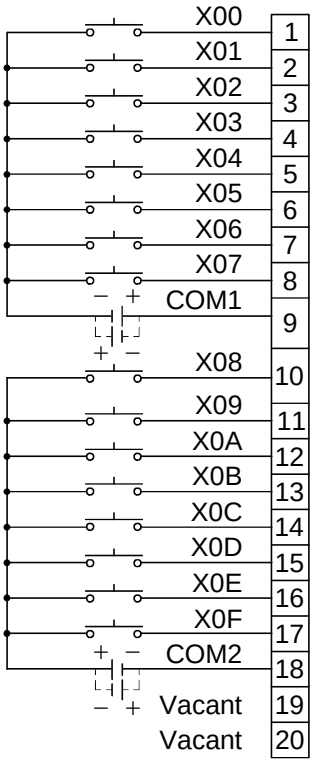
(5)	Model	Rated Input Voltage
	AX42	12/24 VDC



* The figure above indicates [F] (the first half 32 points).
The connections for [L] (the latter half 32 points) are the same as for [F] (regard X00 to X1F as X20 to X3F).
[B1] and [B2] are connected internally.

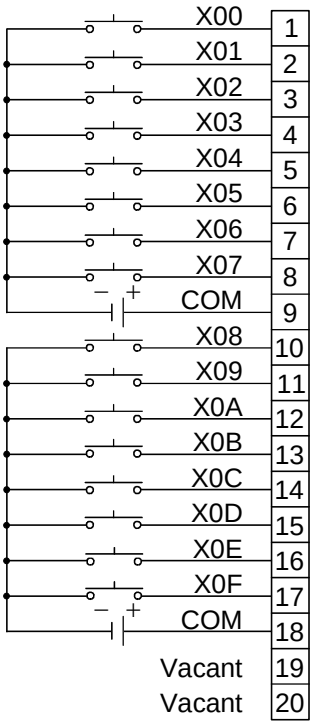
(6)

Model	Rated Input Voltage
AX50-S1	48 VDC



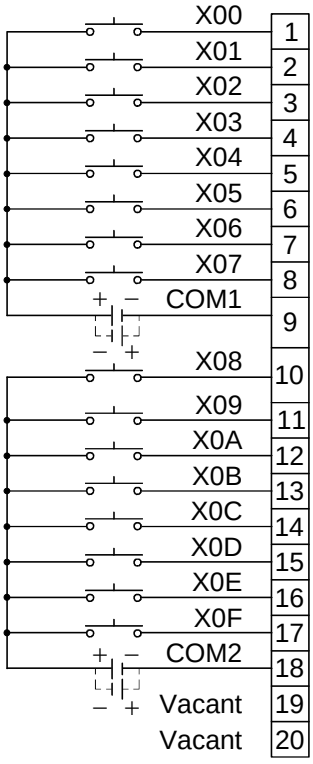
(7)

Model	Rated Input Voltage
AX60	100/110/125 VAC



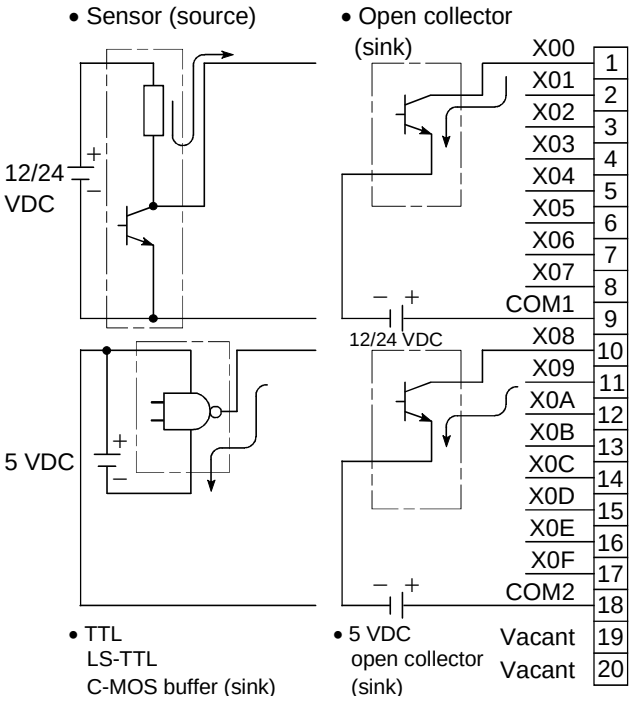
(8)

Model	Rated Input Voltage
AX60-S1	100/110/125 VDC



(9)

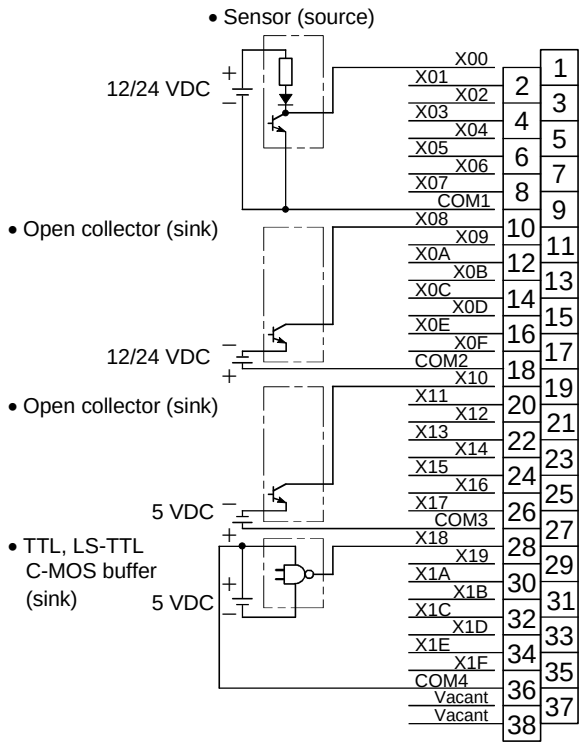
Model	Rated Input Voltage
AX70	5/12/24 VDC



- Can be used in any combination in units of 8 points per common.
  When using the COMS source type, only CMOSs with a 5 VDC rating as shown above can be used (e.g. HCMOS).

(10)

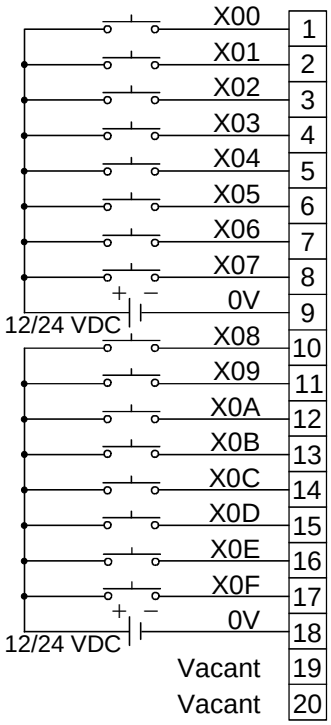
Model	Rated Input Voltage
AX71	5/12/24 VDC



- Can be used in any combination in units of 8 points per common.
  When using the COMS source type, only CMOSs with a 5 VDC rating as shown above can be used (e.g. HCMOS).

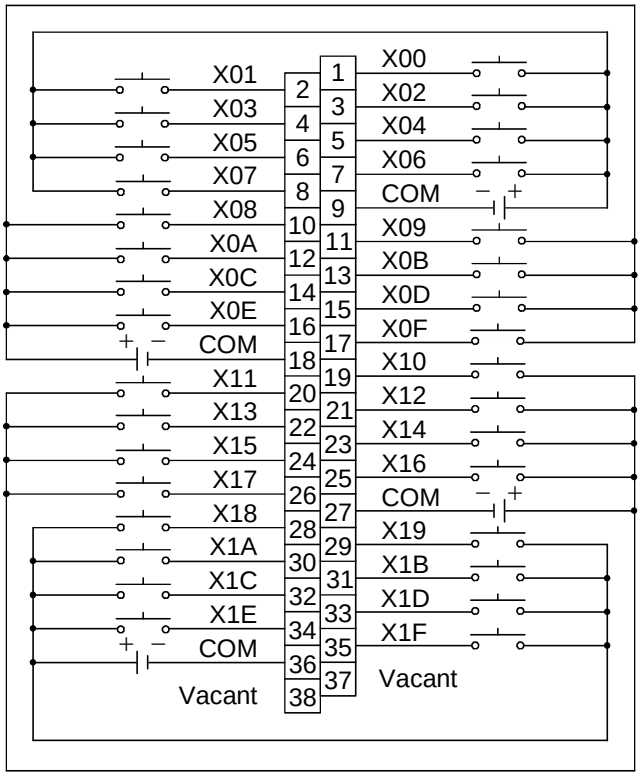
(11)

Model	Rated Input Voltage
AX80	12/24 VDC
AX80E	



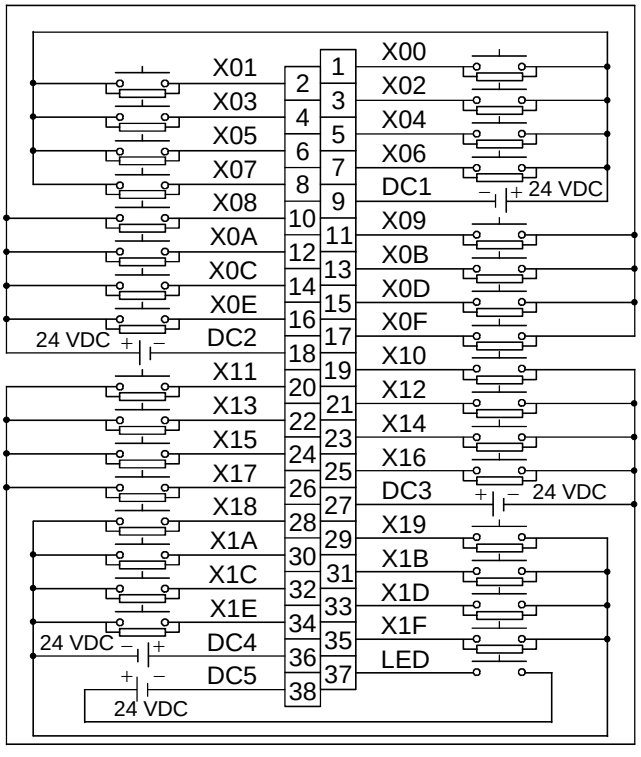
(12)

Model	Rated Input Voltage
AX81	12/24 VDC
AX81-S1	
AX81-S2	48/60 VDC
AX81-S3	12/24 VDC

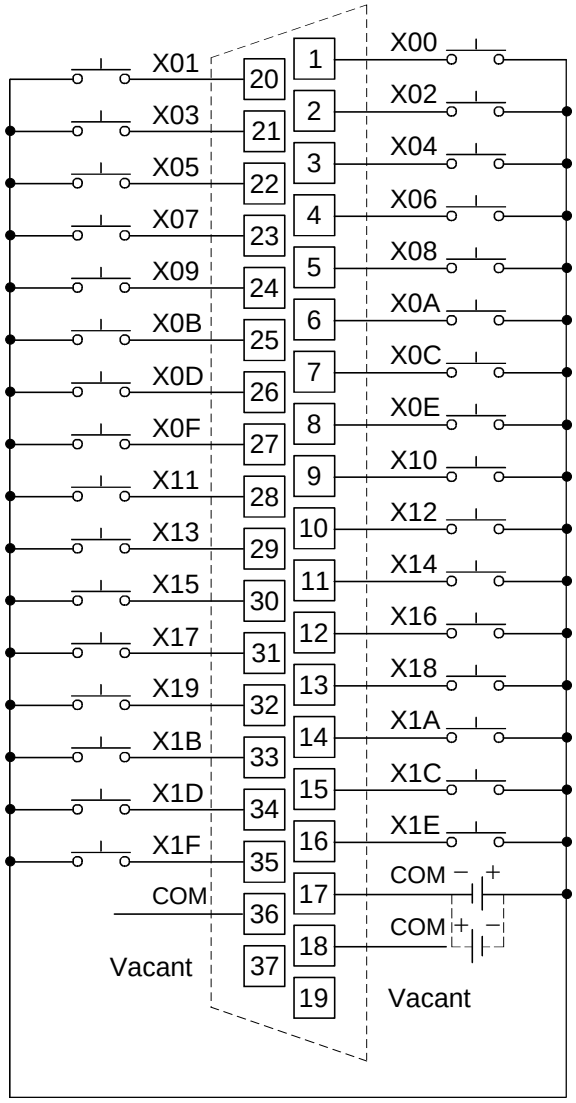


(13)

Model	Rated Input Voltage
AX81B	24 VDC



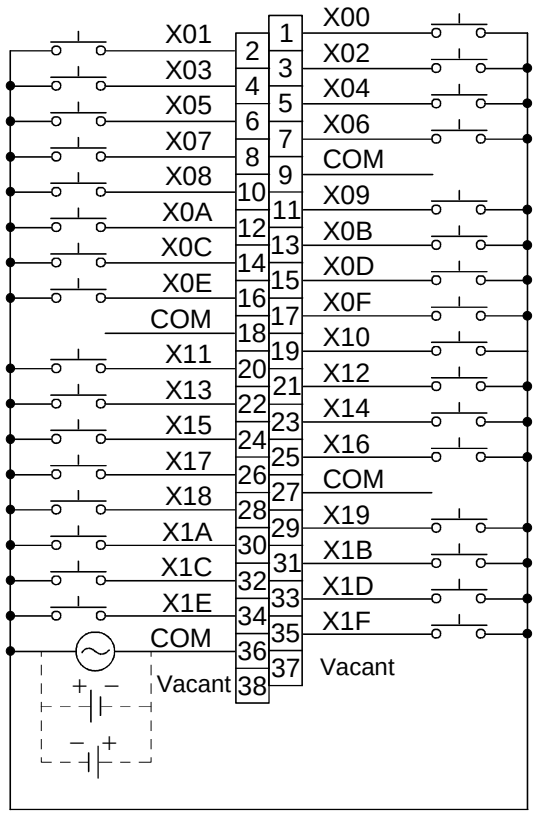
(14)	Model	Rated Input Voltage
	AX82	12/24 VDC



* The figure above indicates [F] (the first half 35 points).
The connections for [L] (the latter half 32 points) are the same as for [F] (regard X00 to X1F as X20 to X3F).
[17], [18], and [36] are connected internally.

(15)

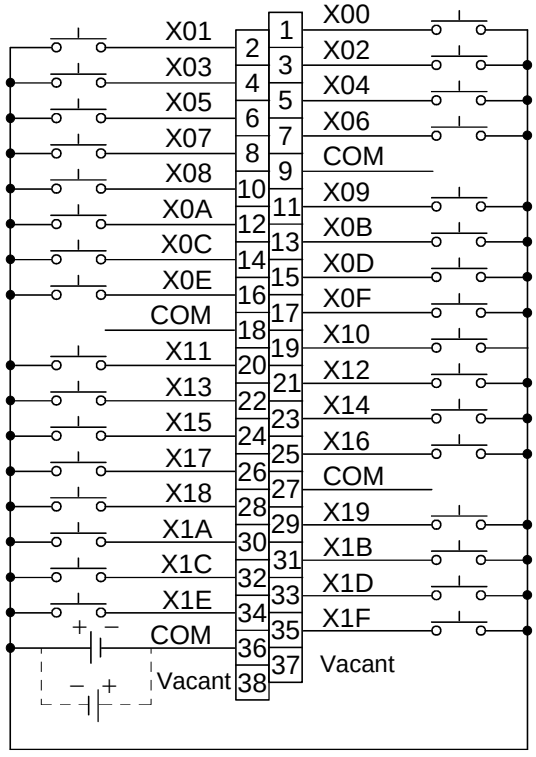
Model	Rated Input Voltage
AX31	12/24 VAC 12/24 VDC



* 9 and 18 , and 27 and 36 are connected internally.

(16)

Model	Rated Input Voltage
AX31-S1	24 VDC



* 9 and 18 , and 27 and 36 are connected internally.

5.2 Output Modules

5.2.1 Output module specifications

Model	Output Type	No. of Points/ Module	Rated Load Voltage	Max. Load Current		Input Response Time		
				Per Point	Per Common	OFF to ON	ON to OFF	
AY10	Contact output	16 points	240VAC 24VAC	2A	8A	10msec or less	12msec or less	
AY10A	Contact output (All points independent)				16A/all points			
AY11	Contact output				8A			
AY11A	Contact output (All points independent)				16A/all points			
AY11AEU								
AY11E	Contact output				8A			
AY11EEU								
AY13		32 points			5A			
AY13E								
AY13EEU								
AY15EU		24 points			8A			
AY20EU	Triac output	16 points	100 to 200 VAC	0.6A	1.9A	1msec or less	0.5Hz + 1msec or less	
AY22				2A	3.3A			
AY23		32 points		0.6A	2.4A *4 (1.05A)			
AY40	Transistor output (sink type)	16 points	12/24VDC	0.1A	0.8A	2msec or less	2msec or less (resistive load)	
AY40A	Transistor output (all points independent sink type)			0.3A	—			
AY40P	Transistor output (sink type)			0.1A	0.8A			

	External Connections	Common Terminal Arrangement	Surge Suppression	Fuse Rating	Error Display	External Power Supply (TYP 24VDC) Current	Internal Current Consumption	Number of Occupied I/O Points
	20 terminal block connector	8 points/ common	None	None	None	0.15A	0.115A	16 points
	38 terminal block connector	No common (all points independent)						
	20 terminal block connector	8 points/ common	Varistor					
	38 terminal block connector	No common (all points independent)						
	20 terminal block connector	8 points/ common		8A			0.23A	32 points
	38 terminal block connector		None	None		0.29A		
				8A				
	38 terminal block connector	4 points/ common	CR absorber	3.2A	Display	—	0.4A	16 points
	20 terminal block connector	8 points/ common	CR absorber varistor	7A *6	Display *10		0.305A	16 points
	38 terminal block connector		Absorber	3.2A *6	None		0.59A	32 points
	20 terminal block connector		Clamp diode	None		0.008A	0.115A	16 points
	38 terminal block connector	No common (all points independent)	Surge absorbing diode			—	0.19A	
	20 terminal block connector	8 points/ common	Cramp diode			0.015A	0.115A	

•To next page•

(From front page)

Model	Output Type	No. of Points/ Module	Rated Load Voltage	Max. Load Current		Input Response Time		
				Per Point	Per Common	OFF to ON	ON to OFF	
AY41	Transistor output (sink type)	32 points	12/24VDC	0.1A	1.6A	2msec or less	2msec or less (resistive load)	
AY41P					1A			
AY42 *1		64 points		0.1A	2A *4 (1.6A)			
AY42-S1 *1								
AY42-S3 *1				0.1A *5	2A			
AY42-S4 *1				0.1A	1.92A			
AY50		16 points		0.5A	2A			
AY51		32 points			2A *4 (3.3A)			
AY51-S1				0.3A	2A			
AY60		16 points	24VDC (12/48V) *2	2A	5A			
AY60E	Transistor output (source type)			12/24 VDC 2A 48VDC 0.8A	3A			
AY60EP			12/24VDC	12VDC 2A	9.6A	0.5msec or less	1.5msec or less	
				24VDC 0.8A	3.8A			
AY60S	Transistor output (sink type)		24/48VDC (12V) *3	2A	6.4A	1msec or less	3msec or less (resistive load)	
AY70	Transistor output (for TTL. COMOS) (sink type)	16 points	5/12VDC	0.016A	0.128A	1msec or less	1msec or less	
AY71		32 points		0.016A	0.256A			
AY72 *1		64 points		0.016A	0.512A			

	External Connections	Common Terminal Arrangement	Surge Suppression	Fuse Rating	Error Display	External Power Supply (TYP 24VDC) Current	Internal Current Consumption	Number of Occupied I/O Points
	38 terminal block connector	16 points/ common	Cramp diode	None	None	0.02A 0.03A	0.23A	32 points
	40-pin connector × 2	32 points/ common	Cramp diode	None	None	0.04A	0.34A 0.23A	32 points
				1.6A *7	Display *11		0.29A	64 points
			Photo coupler Built-in Zener diode	None	None	—	0.5A	
	20 terminal block connector	8 points/ common	Varistor	2A *6	Display *10	0.065A	0.115A	16 points
	38 terminal block connector	16 points/ common		None	None	0.05A	0.023A	32 points
			Transistor Built-in Zener diode	1A *8	Display *10	0.1A	0.31A	
	20 terminal block connector	8 points/ common	Varistor	3.2A *9	Display	0.065A	0.115A	16 points
			Surge absorbing diode	5A *9		0.065A		
				None	None	0.11A		
			Varistor	5A *9		0.003A	0.075A	
			None	None		*12 0.055A	0.1A	16 points
	38 terminal block connector	16 points/ common				*12 0.1A	0.2A	32 points
	40-pin connector × 2	32 points/ common				*12 0.3A	0.3A	64 points

• To next page •

(From front page)

Model	Output Type	No. of Points/ Module	Rated Load Voltage	Max. Load Current		Input Response Time		
				Per Point	Per Common	OFF to ON	ON to OFF	
AY80	Transistor output (source type)	16 points	12/24VDC	0.5A	2A	2msec of less	2msec of less (resistive load)	
AY80EP				0.8A	3.84A	0.5msec or less	1.5msec or less	
AY81	Transistor output (source type)	32 points	12/24VDC	0.5A	4A	2msec of less	2msec of less (resistive load)	
AY81EP				12VDC 0.8A	7.68A	0.5msec or less	1.5msec or less	
				24VDC 0.4A	3.84A			
*1 AY82EP		64 points		12VDC 0.1A	1.92A			
				24VDC 0.04A	0.758A			

	External Connections	Common Terminal Arrangement	Surge Suppression	Fuse Rating	Error Display	External Power Supply (TYP 24VDC) Current	Internal Current Consumption	Number of Occupied I/O Points
	20 terminal block connector	8 points/ common	Varistor	2A *6	Display *10	0.06A	0.115A	16 points
			Surge absorbing diode	None	None	0.11A		
	38 terminal block connector	16 points/ common	Varistor	None	None	0.05A	0.23A	32 points
			Surge absorbing diode			0.22A		
	40-pin connector × 2	32 points/ common				0.05A	0.29A	64 points

The following specifications apply to all modules:

Isolation method : Photocoupler
Input indication : LEDs

*1 : The ON/OFF status of the first or latter half is indicated by the LEDs in accordance with the setting of the selector switch on the front panel of the module:
FH setting: First half (X00 to X1F), LH setting: Latter half (X20 to X3F)

*2 : When 12/48 VDC is used as the load power supply, a separate 24 VDC power supply must be used as an external power supply.

*3 : When 12 VDC is used as the load power supply, a separate 24/48 VDC power supply must be used as an external power supply.

*4 : When the module is installed adjacent to the power supply module, the value indicated in parentheses applies.

*5 : The maximum load current differs depending on the number of simultaneously ON points.

*6 : Fast-melting fuse (one per common)

*7 : Normal fuse (two per common)

*8 : Fast-melting fuse (two per 8-per-common unit)

*9 : Fast-melting fuse (two per common)

*10 : LED comes on when a fuse blows or the external power supply is turned off.

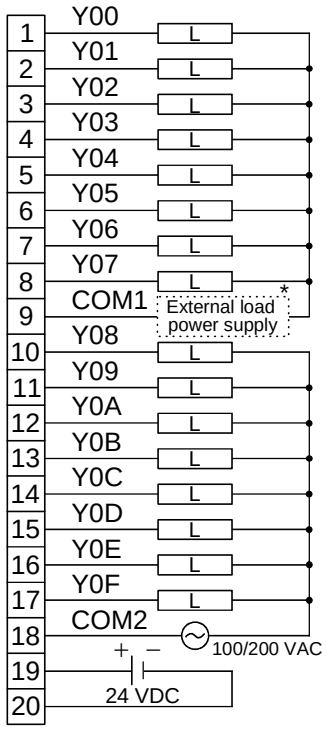
*11 : Since this is a built-in fuse directly fixed to the module, replace the entire module if it blows.

*12 : TYP. 12 VDC

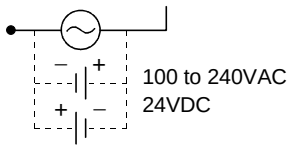
5.2.2 Output module connections

(1)

Model	Rated Input Voltage
AY10	24 VDC 240 VAC
AY11	
AY11E	
AY11EEU	

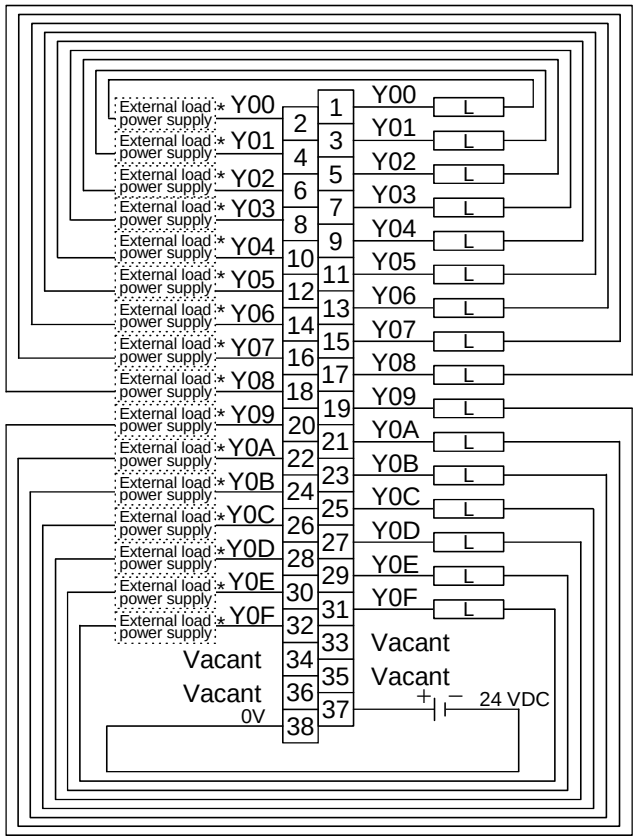


*: The external load power supply section is as shown below.

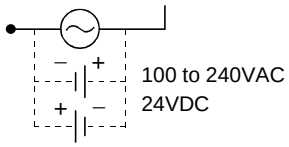


(2)

Model	Rated Input Voltage
AY10A	24 VDC/240 VAC
AY11A	
AY11AEU	

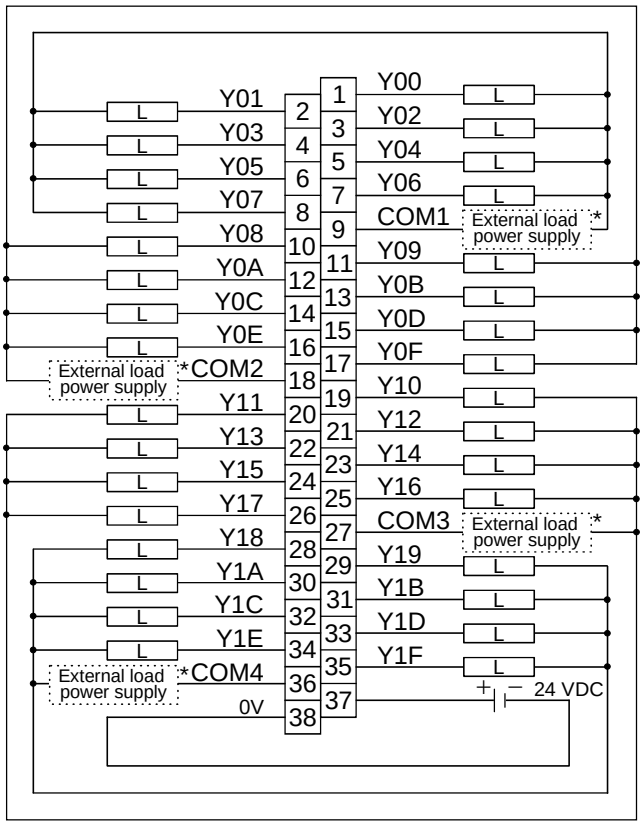


*: The external load power supply section is as shown below.

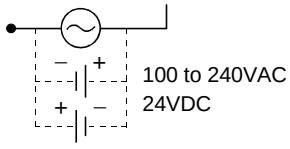


(3)

Model	Rated Input Voltage
AY13	12 VDC/240 VAC
AY13E	
AY13EEU	

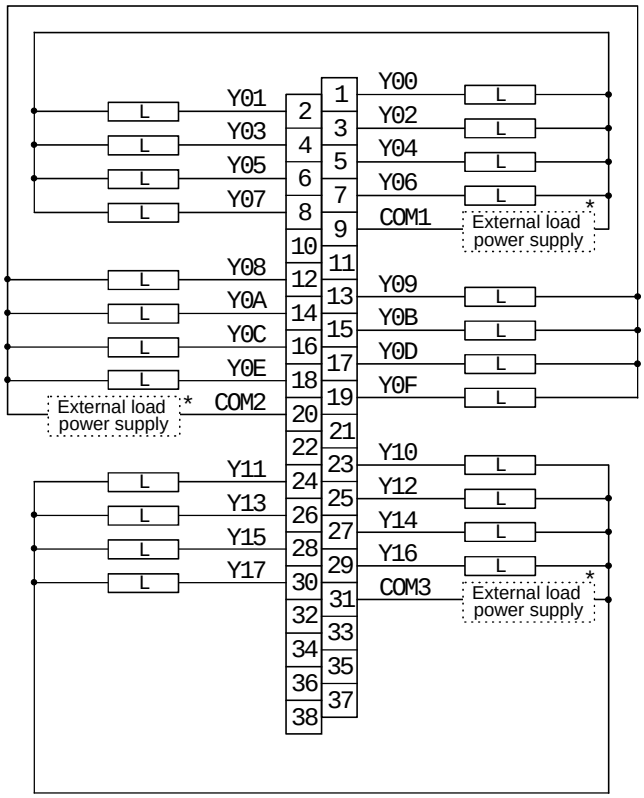


*: The external load power supply section is as shown below.

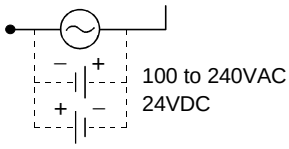


(4)

Model	Rated Input Voltage
AY15EU	240 VAC/24 VDC

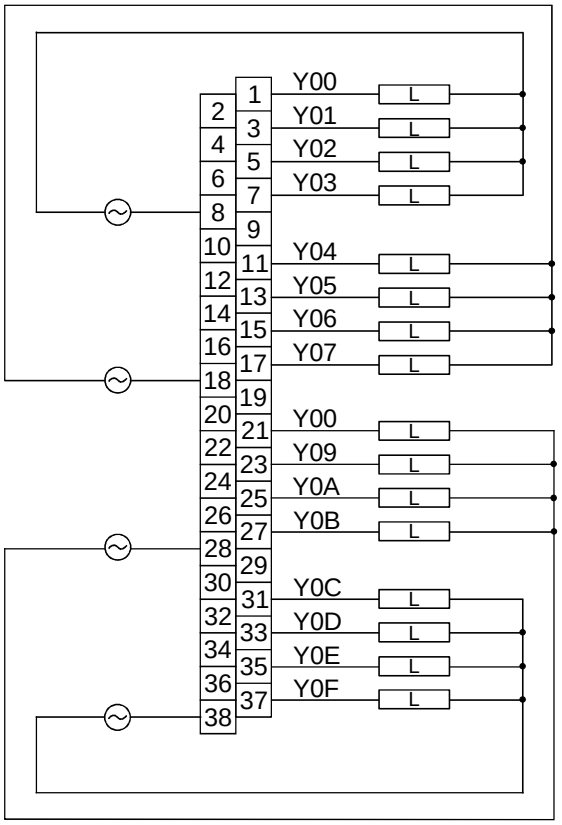


*: The external load power supply section is as shown below.



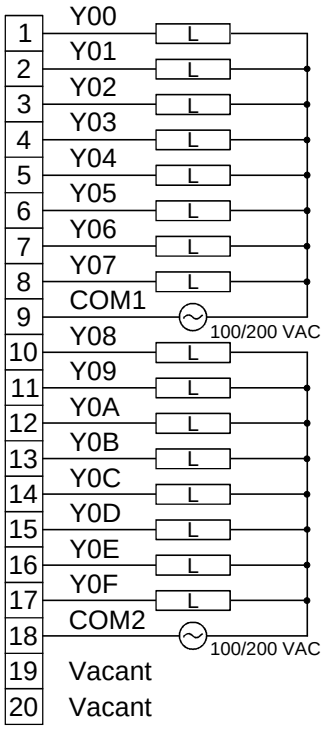
(5)

Model	Rated Input Voltage
AY20EU	100/240 VAC



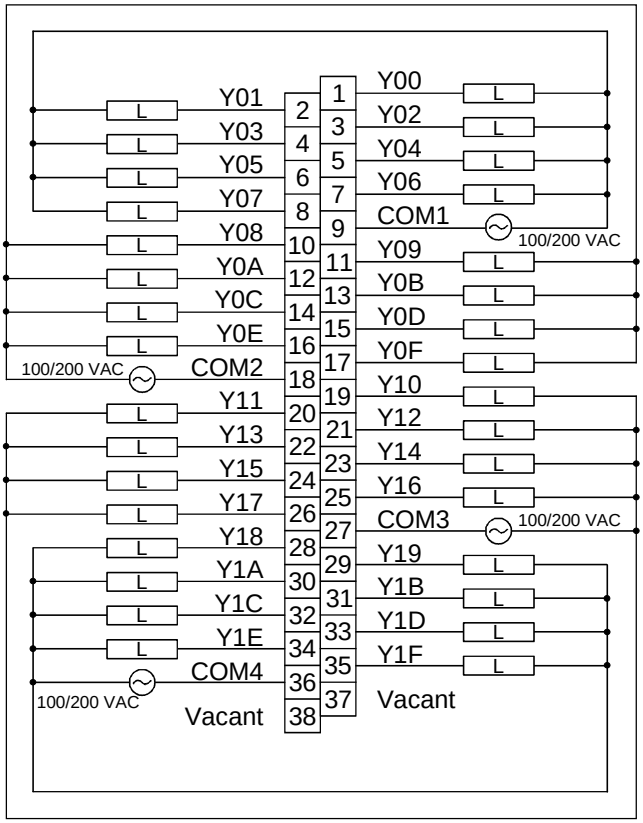
(6)

Model	Rated Input Voltage
AY22	100/240 VAC



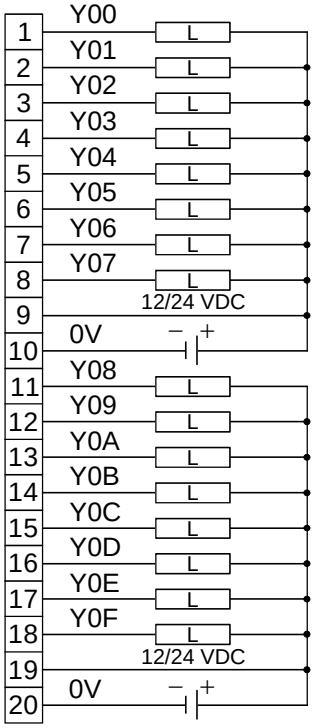
(7)

Model	Rated Input Voltage
AY23	100/240 VAC



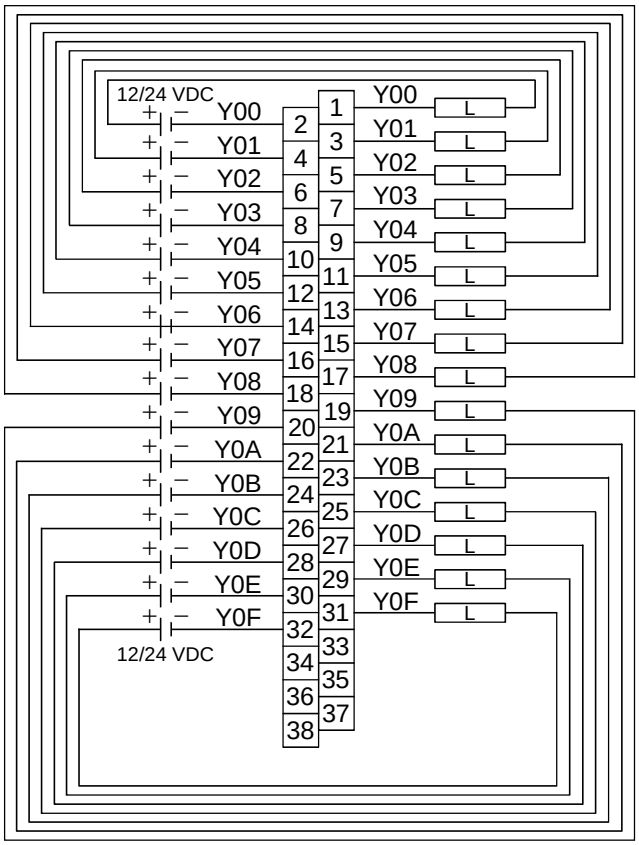
(8)

Model	Rated Input Voltage
AY40	12/24 VDC
AY40P	
AY50	



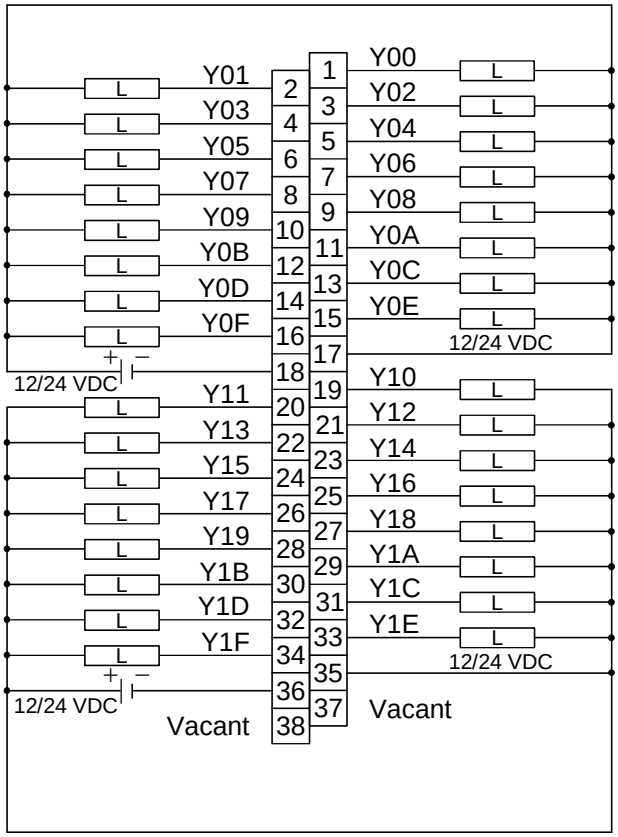
(9)

Model	Rated Input Voltage
AY40A	12/24 VDC



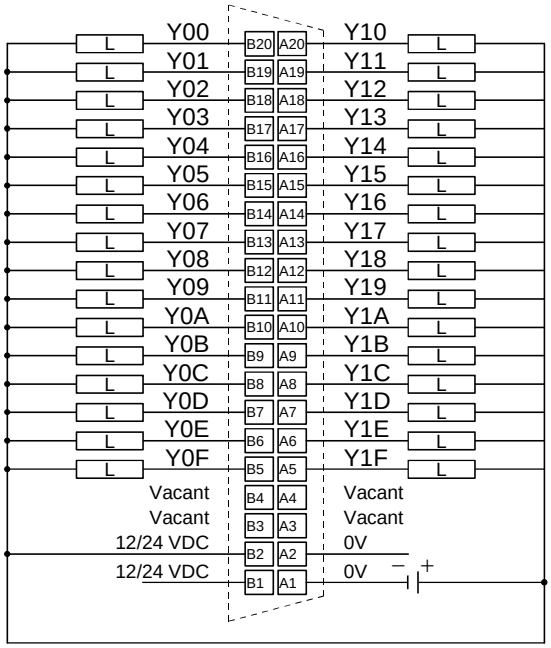
(10)

Model	Rated Input Voltage
AY41	12/24 VDC
AY41P	



(11)

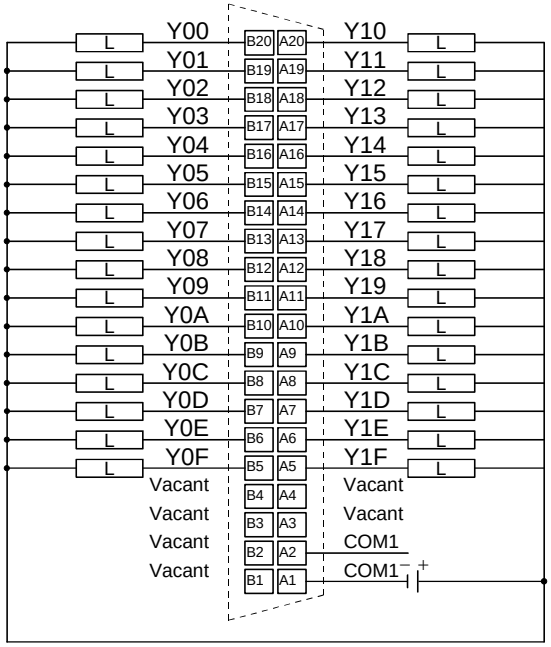
Model	Rated Input Voltage
AY42	12/24 VDC
AY42-S1	
AY42-S3	



* The figure above indicates F (the first half 32 points).
The connections for L (the latter half 32 points) are the same as for F (regard Y00 to Y1F as Y20 to Y3F).
B1 and B2 , and A1 and A2 are connected internally.

(12)

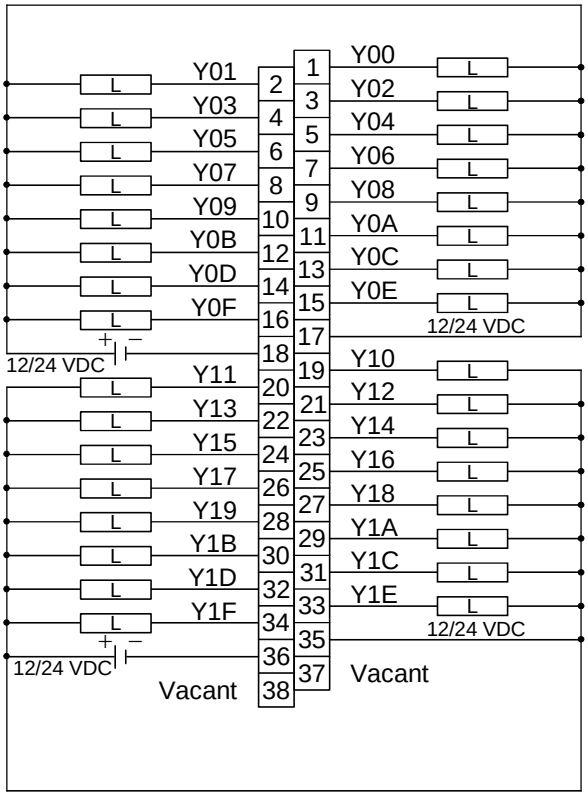
Model	Rated Input Voltage
AY42-S4	12/24 VDC



* The figure above indicates F (the first half 32 points).
The connections for L (the latter half 32 points) are the same as for F (regard Y00 to Y1F as Y20 to Y3F).
Regard COM1 as COM2.
B1 and B2 , and A1 and A2 are connected internally.

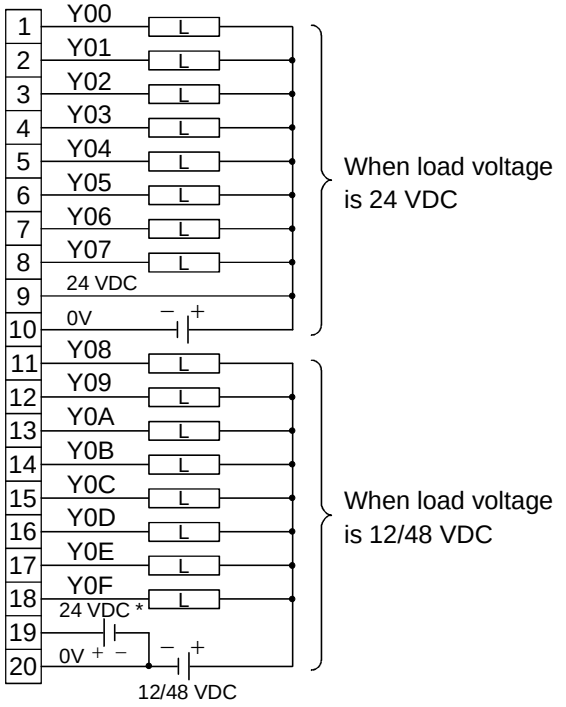
(13)

Model	Rated Input Voltage
AY51	12/24 VDC
AY51-S1	



(14)

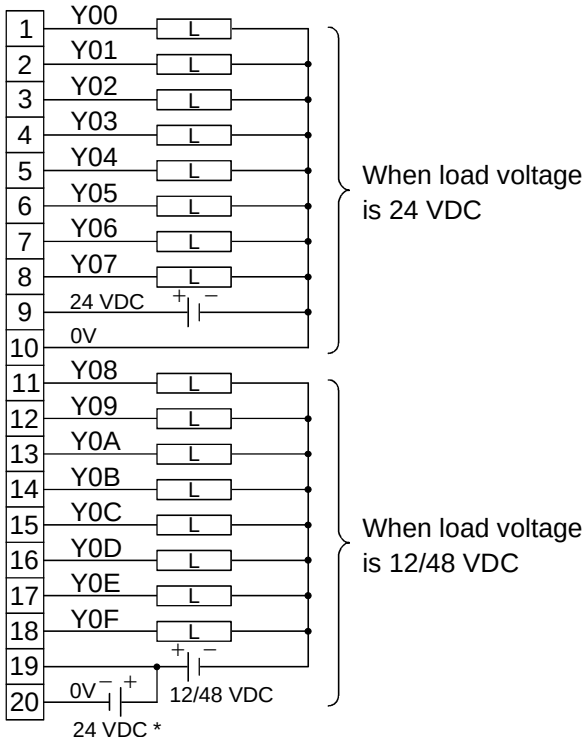
Model	Rated Input Voltage
AY60	24 (12/48) VDC



- When 12/48 VDC is used as the load power supply, a separate 24 VDC power supply must be used as an external power supply.

(15)

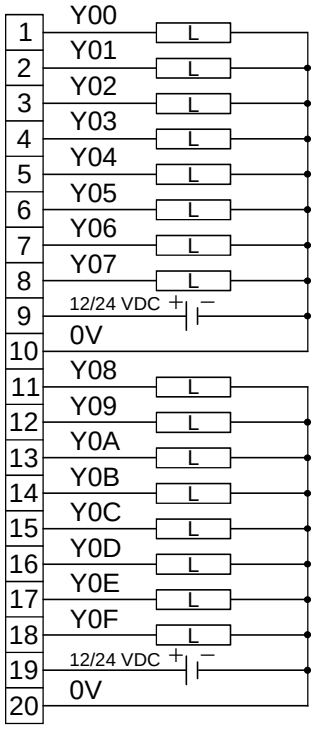
Model	Rated Input Voltage
AY60E	24 (12/48) VDC



- When 12/48 VDC is used as the load power supply, a separate 24 VDC power supply must be used as an external power supply.

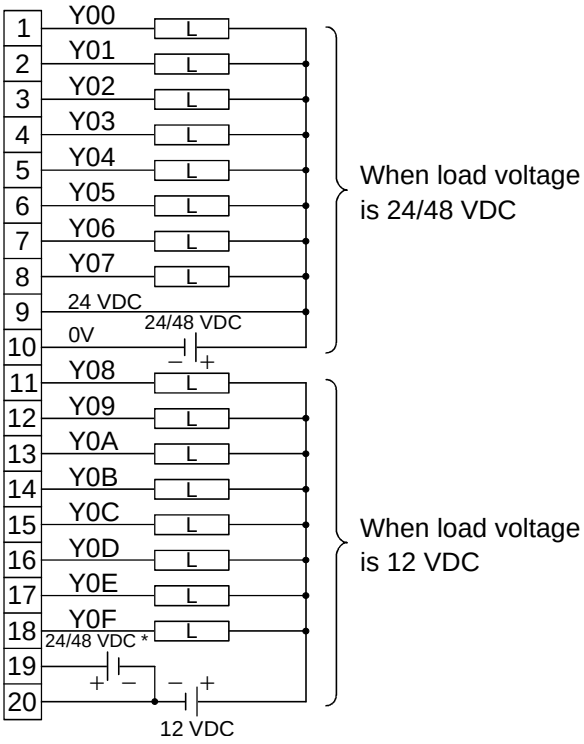
(16)

Model	Rated Input Voltage
AY60EP	12/24 VDC



(17)

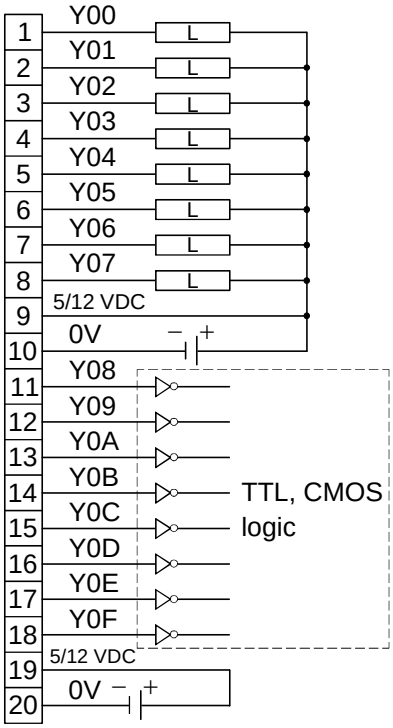
Model	Rated Input Voltage
AY60S	24/48 (12) VDC



- When 12 VDC is used as the load power supply, a separate 24/48 VDC power supply must be used as an external power supply.

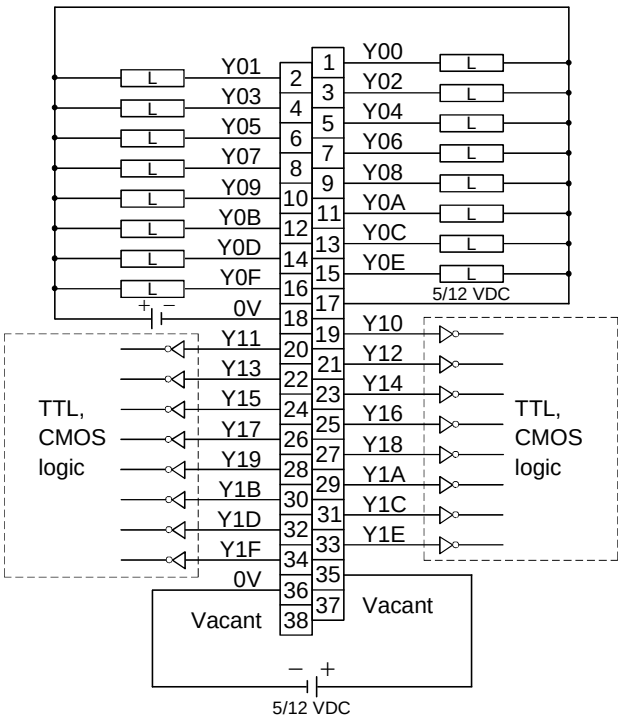
(18)

Model	Rated Input Voltage
AY70	5/12 VDC



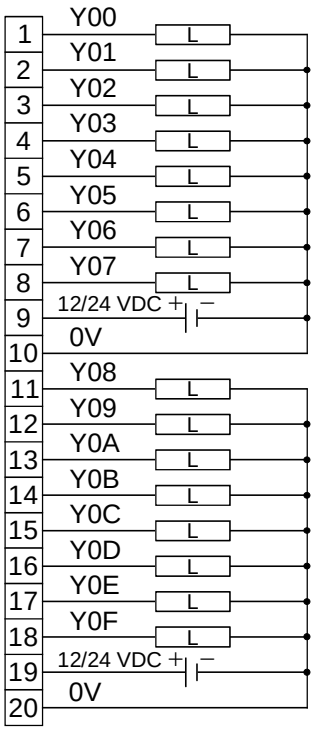
(19)

Model	Rated Input Voltage
AY71	5/12 VDC



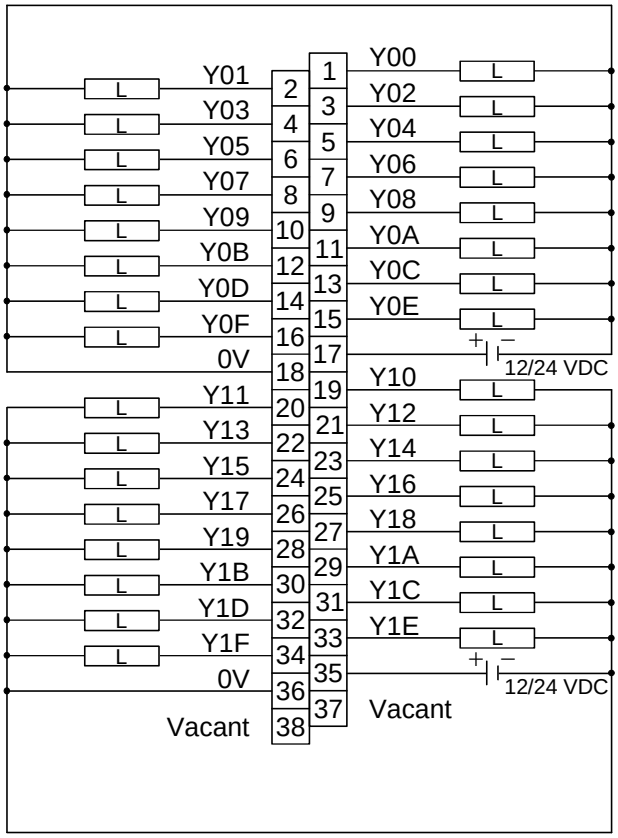
(20)

Model	Rated Input Voltage
AY80	12/24 VDC
AY80EP	



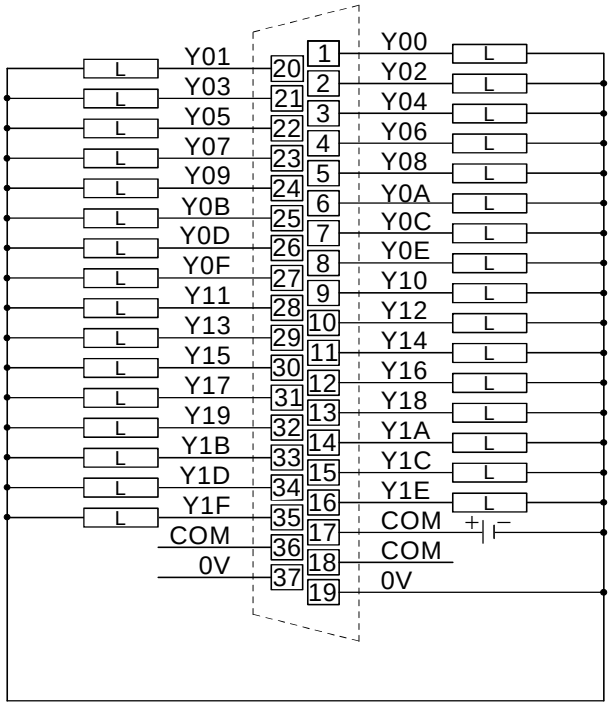
(21)

Model	Rated Input Voltage
AY81	12/24 VDC
AY81EP	



(22)

Model	Rated Input Voltage
AY82EP	12/24 VDC



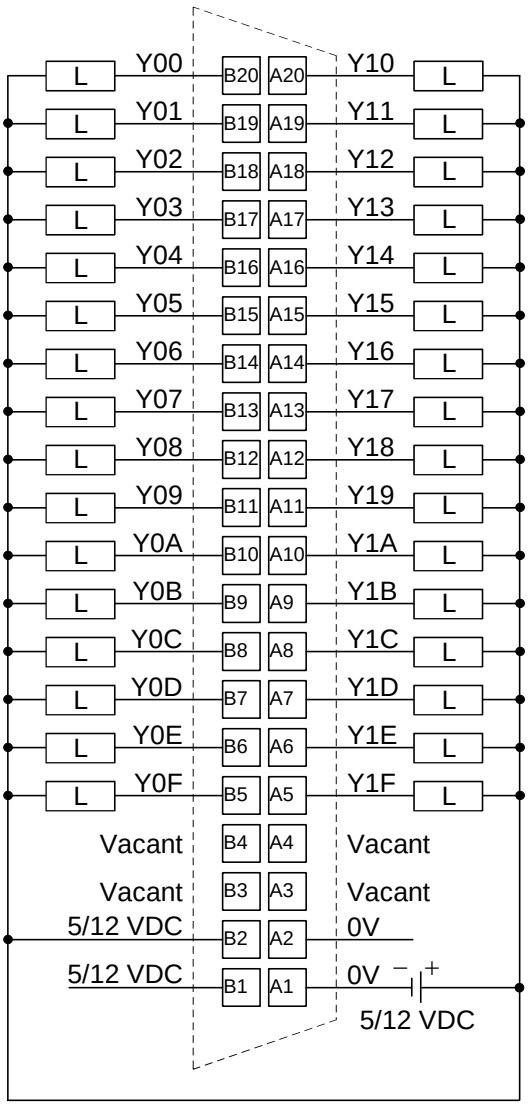
* The figure above indicates [F] (the first half 32 points).

The connections for [L] (the latter half 32 points) are the same as for [F] (regard Y00 to Y1F as Y20 to Y3F).

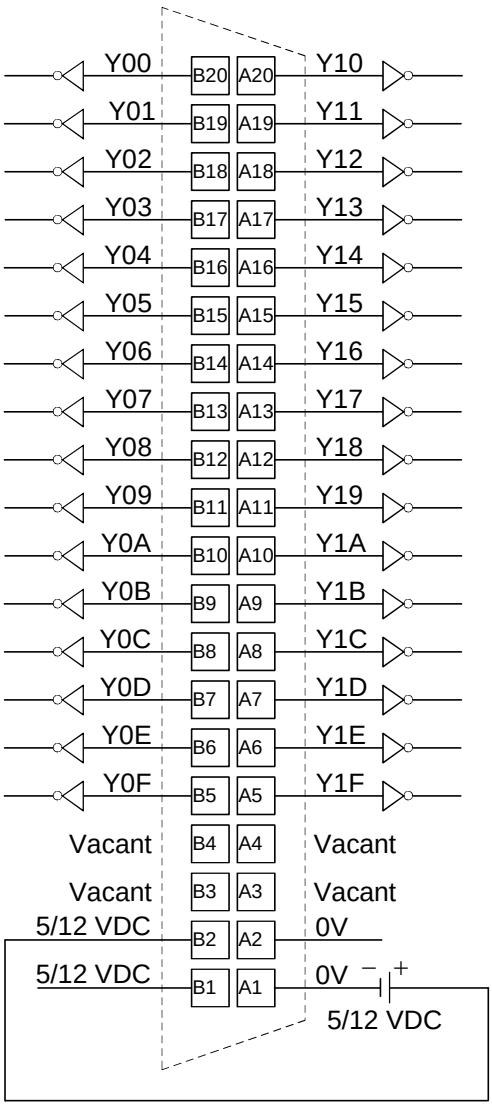
[17] and [18] and [36], and [19] and [37] are connected internally.

(23)	Model	Rated Input Voltage
	AY72	5/12 VDC

Load connection



TTL, CMOS logic



* The figure above indicates [F] (the first half 32 points).
The connections for [L] (the latter half 32 points) are the same as for [F] (regard Y00 to Y1F as Y20 to Y3F).
[B1] and [B2], and [A1] and [A2] are connected internally.

MEMO

5.3 Input/Output Combined Modules

5.3.1 Input/output combined module specifications

Model	Input Type	Number of Points/ Module	Isolation Method	Rated Input Voltage	Input Current	Operating Voltage		
						ON Voltage	OFF Voltage	
A42XY	Dynamic scan	64 points *1	Photocoupler insulation	12/24VDC	—	7VDC or higher	3VDC or lower	
AH42	DC input (sink type)	32 points			3/7mA	9.5VDC or higher	6VDC or lower	

Model	Output Type	No. of Points/ Module	Rated Load Voltage	Max. Load Current		Input Response Time		
				Per Point	Per Common	OFF to ON	ON to OFF	
A42XY	Dynamic scan	64 points	12/24VDC	50mA	—	16msec or less	16msec or less	
AH42	Transistor output (sink type)	32 points		0.1A	1A	2msec or less	2msec or less	

	Maximum Simultaneous ON Input Point (Percentage Simultaneous ON)	Input Response Time		Input Display	External Connections	Common Terminal Arrangement
		OFF to ON	ON to OFF			
	60%	16msec or less	16msec or less	LED display	16-pin connector	—
		10msec or less	10msec or less		40-pin connector × 2	30 points/ common

	External Connections	Common Terminal Arrangement	Surge Suppression	Fuse Ratting	Error Display	External Power Supply (TYP 24VDC) Current	Internal Current Consumption	Number of Occupied I/O Points
	32-pin connector	—	None	None	None	0.18A	0.11A	64 points *1
	40-pin connector × 2	32 points/ common	Clamp diode			0.04A	0.245A	64 points *2

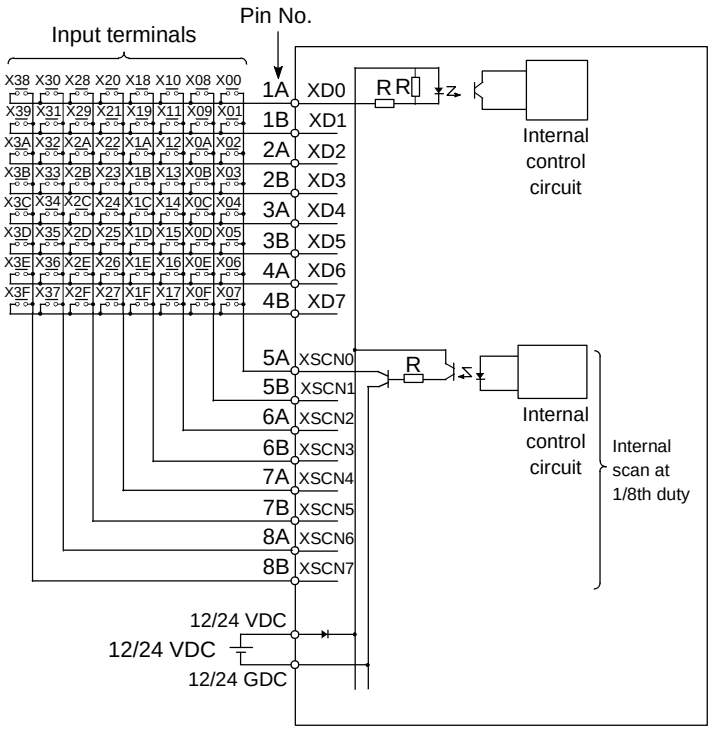
*1 : The same numbers are allocated to both input and output points. The number of occupied I/O points is 64.

*2 : The first half 32 points are allocated to input and the latter half 32 points are allocated to output. Thus, the number of occupied I/O points is 64. When I/O allocation is carried out at a peripheral device, both modules should be set as 64-point output modules.

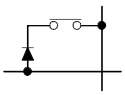
5.3.2 Input/output combined module connections

(1)	Model	Rated Input Voltage	Rated Load Voltage
	A42XY	12/24 VDC	12/24 VDC

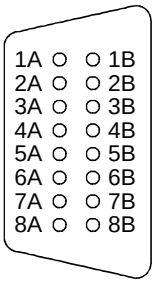
Error!



* If there will be cases when two or more switches are pressed simultaneously, install a diode at each switch (see right)



Pin Arrangement

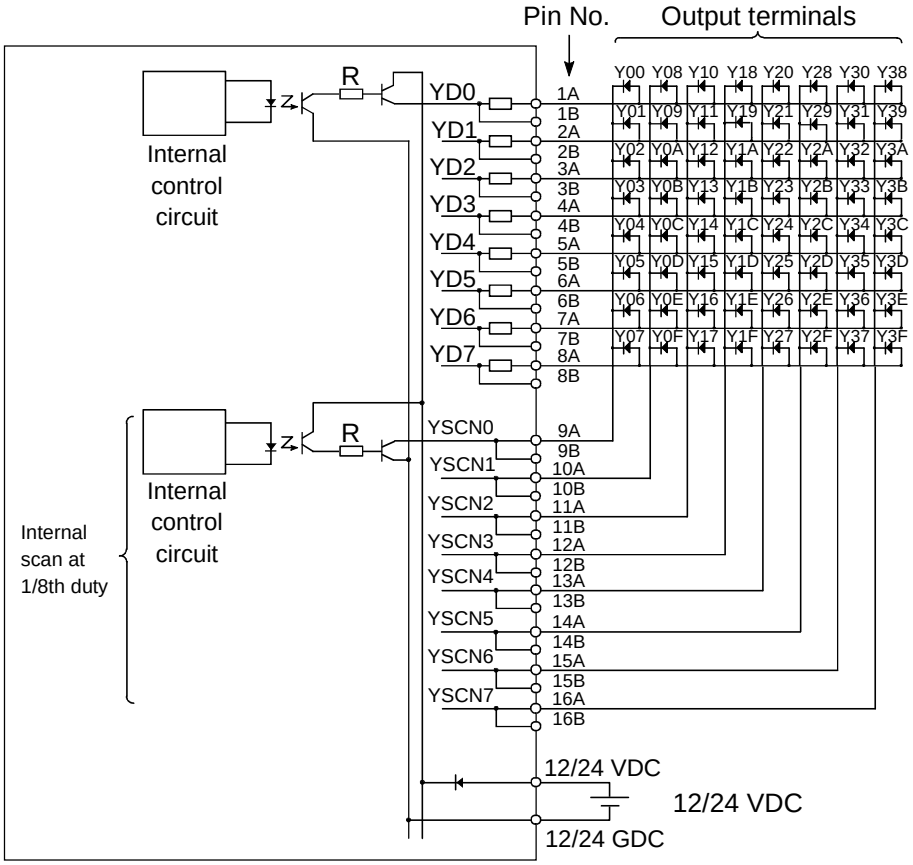


Seen from front face of the module

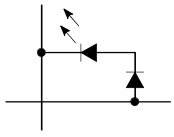
Pin No.	Signal Name	Pin No.	Signal Name
1A	XD0	1B	XD1
2A	XD2	2B	XD3
3A	XD4	3B	XD5
4A	XD6	4B	XD7
5A	XSCN0	5B	XSCN1
6A	XSCN2	6B	XSCN3
7A	XSCN4	7B	XSCN5
8A	XSCN6	8B	XSCN7

(1)	Model	Rated Input Voltage	Rated Load Voltage
	A42XY	12/24 VDC	12/24 VDC

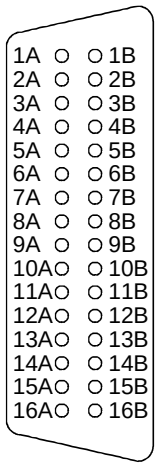
Output side



* The power supply voltage (12/24 VDC) is applied in the LED's reverse direction.
If the peak inverse voltage insufficient, connect protective diodes in series with each of the LEDs. (see right)



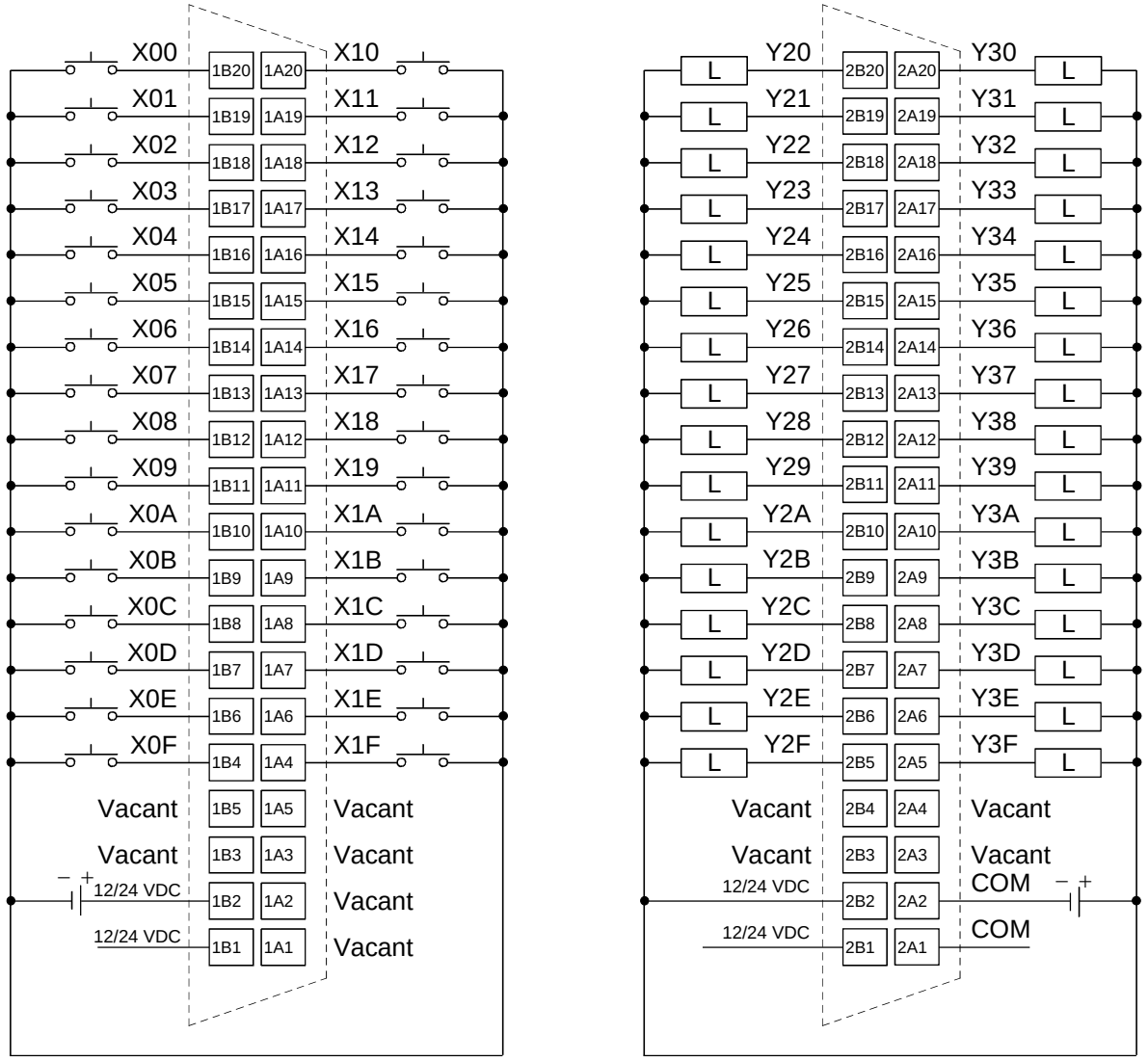
Pin Arrangement



Seen from front face of the module

Pin No.	Signal Name	Pin No.	Signal Name
1A	YD0	1B	YD1
2A	YD1	2B	YD2
3A	YD2	3B	YD3
4A	YD3	4B	YD4
5A	YD4	5B	YD5
6A	YD5	6B	YD6
7A	YD6	7B	YD7
8A	YD7	8B	YD8
9A	YSCN0	9B	YSCN0
10A	YSCN1	10B	YSCN1
11A	YSCN2	11B	YSCN2
12A	YSCN3	12B	YSCN3
13A	YSCN4	13B	YSCN4
14A	YSCN5	14B	YSCN5
15A	YSCN6	15B	YSCN6
16A	YSCN7	16B	YSCN7

(2)	Model	Rated Input Voltage	Rated Load Voltage
	AH42	12/24 VDC	12/24 VDC



X (Input side)

Y (Output side)

* 1B1 and 1B2 are connected internally.

* 2B1 and 2B2 , and 2A1 and 2A2 are connected internally.

If an error occurs in the RUN mode, an error display or error code (including a step number) is stored in the special register by the self-diagnostic function. The error code reading procedure and the causes of and corrective actions for errors are shown below.

Section 6.1 Error Code List for AnNCPU (Table 6.1)
Section 6.2 Error Code List for AnACPU (Table 6.2)
Section 6.3 Error Code List for AnUCPU (Table 6.3)
Errors should be cleared by taking appropriate action.

6.1 Error Code List for AnNCPU

This section gives the error descriptions, possible causes, and corrective action for AnNCPU error codes and error messages.

Table 6.1 Error Code List for AnNCPU

Error Message	Error Code (D9008)	CPU States	Error and Cause	Corrective Action
"INSTRCT. CODE ERR" (Checked at the execution of instruction)	10	Stop	Instruction code, which cannot be decoded by CPU, is included in the program. (1) EP-ROM or memory cassette, which cannot be decoded, has been loaded. (2) Since the memory contents have changed for some reason, instruction code, which cannot be decoded, has been included.	(1) Read the error step by use of a peripheral equipment and correct the program at that step. (2) In the case of EP-ROM or memory cassette, rewrite the contents or replace with an EP-ROM or memory cassette which stores correct contents.
"PARAMETE R ERROR" (Checked at power-on, STOP → RUN, and PAUSE → RUN)	11	Stop	(1) Capacity larger than the memory capacity of CPU module has been set with the peripheral equipment and then write to CPU module has been performed. (2) The contents of parameters of CPU memory have changed due to noise or the improper loading of memory. (3) RAM is not loaded to the A1 or A1NCPU.	(1) Check the memory capacity of CPU with the memory capacity set by peripheral equipment and re-set incorrect area. (2) Check the loading of CPU memory and load it correctly. Read the parameter contents of CPU memory, check and correct the contents, and write them to CPU again. (3) Install the RAM and write parameter contents from a peripheral device.

Table 6.1 Error Code List for AnNCPU (Continue)

Error Message	Error Code (D9008)	CPU States	Error and Cause	Corrective Action
"MISSING END INS." (Checked at STOP → RUN)	12	Stop	(1) There is no [END] ([FEND]) instruction in the program. (2) When subprogram has been set by the parameter, there is no [END] instruction in the subprogram.	Write [END] instruction at the end of program.
"CAN'T EXECUTE(P) " (Checked at the execution of instruction)	13	Stop	(1) There is no jump destination or multiple destinations specified by the [CJ], [SCJ], [CALL], [CALLP], or [JMP] instruction. (2) There is a [CHG] instruction and no setting of subprogram. (3) Although there is no [CALL] instruction, the [RET] instruction exists in the program and has been executed. (4) The [CJ], [SCJ], [CALL], [CALL P], or [JMP] instruction has been executed with its jump destination located below the [END] instruction.	Read the error step by use of peripheral equipment and correct the program at that step. (Insert a jump destination or reduce multiple destinations to one.

Table 6.1 Error Code List for AnNCPU (Continue)

Error Message	Error Code (D9008)	CPU States	Error and Cause	Corrective Action
"CAN'T EXECUTE(P) " (Checked at the execution of instruction)	13	Stop	(5) The number of the FOR instructions is different from that of the NEXT instructions. (6) A JMP instruction is given within a FOR to NEXT loop causing the processing to exit the loop. (7) Processing exited subroutine by the JMP instruction before execution of the RET instruction. (8) Processing jumped into a step in a FOR to NEXT loop or into a subroutine by the JMP instruction. (9) The STOP instruction is given in an interrupt program, a subroutine program or in a FOR to NEXT loop.	Read the error step by use of peripheral equipment and correct the program at that step. (Insert a jump destination or reduce multiple destinations to one.

Table 6.1 Error Code List for AnNCPU (Continue)

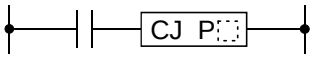
Error Message	Error Code (D9008)	CPU States	Error and Cause	Corrective Action
"CHK FORMAT ERR" (Checked at STOP/PAUSE→RUN)	14	Stop	(1) Instructions (including NOP) except LD X□, LDI X□, AND X□ and ANI X□ are included in the CHK instruction circuit block. (2) Multiple CHK instructions are given. (3) The number of contact points in the CHK instruction circuit block exceeds 150. (4) There is no  circuit block before the CHK instruction circuit block. (5) The device number of D1 of the CHK D1 D2 instruction is different from that of the contact point before the CJ P□ instruction. (6) Pointer P254 is not given to the head of the CHK instruction circuit block. 	Check the program in the CHK instruction circuit block according to items (1) to (6) in the left column. Correct problem using the peripheral and perform operation again.

Table 6.1 Error Code List for AnNCPU (Continue)

Error Message	Error Code (D9008)	CPU States	Error and Cause	Corrective Action
"CAN'T EXECUTE (I)" (Checked at the occurrence of interruption)	15	Stop	(1) Although the interrupt module is used, there is no number of interrupt pointer I, which corresponds to that module, in the program or there are multiple numbers. (2) No IRET instruction has been entered in the interrupt program. (3) There is IRET instruction another than the interrupt program.	(1) Check for the presence of interrupt program which corresponds to the interrupt unit, create the interrupt program, and reduce the same numbers of I. (2) Check if there is IRET instruction in the interrupt program and enter the IRET instruction. (3) Check if there is IRET instruction in other than the interrupt program and delete the IRET instruction.
"CASSETTE ERROR" (Checked at power-on) An, AnN only	16	Stop	The memory cassette is not loaded.	Turn off the power, insert the memory cassette and turn on the power again.
"ROM ERR"	17	Stop	Parameters and/or sequence programs are not correctly written to the mounted memory cassette.	(1) Correctly write parameters and/or sequence programs to the memory cassette. (2) Remove the memory cassettes that contain no parameters or sequence programs.
			Parameters stored in the memory cassette have exceeded the limit of available program capacity. Ex.) Default parameters (program capacity: 6k steps) are written to A1NMCA-2KE.	(1) Adjust the program capacity for parameters to the memory cassette used. (2) Use the memory cassette of which memory capacity is larger than the program capacity for parameters.

Table 6.1 Error Code List for AnNCPU (Continue)

Error Message	Error Code (D9008)	CPU States	Error and Cause	Corrective Action
"RAM ERROR" (Checked at power-on)	20	Stop	The CPU has checked if write and read operations can be performed properly to the data memory area of CPU, and as a result, either or both has not been performed.	Since this CPU hardware error, consult Mitsubishi representative.
"OPE. CIRCUIT ERR" (Checked at power-on)	21	Stop	The operation circuit, which performs the sequence processing in the CPU, does not operate properly.	
"WDT ERROR" (Checked at the execution of END processing)	22	Stop	Scan time exceeds watch dog error monitor time. (1) Scan time of user program has been exceeded for some conditions. (2) Scan time has lengthened due to instantaneous power failure which occurred during scan.	(1) Calculate and check the scan time of user program and reduce the scan time using the CJ instruction or the like. (2) Monitor the content of special register D9005 by use of peripheral equipment. When the content is other than 0, line voltage is insufficient. When the content is other than 0, the power voltage is unstable.
"SUB-CPU ERROR" (Checked continuously)	23 (During run) 26 (At power-on)	Stop	Sub-CPU is out of control or defective.	Since this CPU hardware error, consult Mitsubishi representative.
"END NOT EXECUTE" (Checked at the execution of END instruction)	24	Stop	(1) When the END instruction was to be executed, the instruction was read as other instruction code due to noise or the like. (2) The END instruction has changed to another instruction code for some reason.	Perform reset and run. If the same error is displayed again, it is the CPU hardware error, consult Mitsubishi representative.

Table 6.1 Error Code List for AnNCPU (Continue)

Error Message	Error Code (D9008)	CPU States	Error and Cause	Corrective Action
"WDT ERROR" (Checked continuously)	25	Stop	The CPU is executing an endless loop.	Since the program is in an endless lop due to the JMP and CJ instructions, check the program.
"MAIN CPU DOWN" (Checked continuously)	26	Stop	Main-CPU is out of control or defective. (Sub-CPU checked it.)	Since this is a CPU hardware error, consult Mitsubishi representative.
"UNIT VERIFY ERR. " (Checked continuously)	31	Stop or Continue (set by para-meter)	I/O module data are different from those at power-on. The I/O module (including the special function module) is incorrectly loaded or has been removed, or a different unit has been loaded.	(1) Among special registers D9116 to D9123, the bit corresponding to the module of verify error is "1". Therefore, use peripheral equipment to monitor the registers and check for the module with “1” and make replacement. (2) When the present unit arrangement is OK, perform reset with the reset switch.
"FUSE BREAK OFF" (Checked continuously)	32	Stop or Continue (set by para-meter)	A fuse is blown in an output module.	(1) Check the fuse blown indicator LED of output module and change the fuse of module of which LED is on. (2) Among special registers D9100 to D9107, the bit corresponding to the unit of fuse break is "1" Replace the fuse of a corresponding module. Monitor and check it.
			The external output supply for AnS output load is not turned off or not connected.	Check if the external power supply for output load is turned on or off.
"CONTROL-BUS ERR. " (Checked at the execution of FROM and TO instructions)	40	Stop	The FROM and TO instructions can-not be executed. Error of control bus with special function module.	Since this is a hardware error of a special function module, CPU module, or base unit, replace the module and check the defective module, consult Mitsubishi representative.

Table 6.1 Error Code List for AnNCPU (Continue)

Error Message	Error Code (D9008)	CPU States	Error and Cause	Corrective Action
"SP. UNIT DOWN" (Checked at the execution of FROM and TO instructions.)	41	Stop	When the FROM or TO instruction is executed, access has been made to the special function module but the answer is not given. The accessed special function module is defective.	Since this is an accessed special function module error, consult Mitsubishi representative.
"LINK UNIT ERROR"	42	Stop	The data link module is loaded in the master station.	Remove the data link module from the master station. After correction, reset and start from the initialization.
"I/O INT. ERROR"	43	Stop	Although the interrupt module is not loaded, interruption has occurred.	Since this is a hardware error of a specific module, replace the module and check the defective module, consult Mitsubishi representative.
"SP. UNIT LAY. ERROR."	44	Stop	(1) Three or more computer link units are loaded with respect to one CPU module.(A1SCPU24-R2 is also counted as one unit.) (2) Two or more data link modules are loaded. (3) Two or more interrupt units are loaded. (4) A special function module is assigned in place of an I/O module, or vice versa, at I/O assignment of parameters on peripheral devices. (5) The input/output modules or special function modules are loaded at the input/output numbers exceeding the number of input/output points, or GOT is connected via bus line.	(1) Reduce the computer link modules to two or less. (2) Reduce the data link modules to one or less. (3) Reduce the interrupt module to one. (4) Re-set the I/O assignment of parameter setting by use of peripheral devices according to the actually loaded special function module. (5) Review the input/output numbers, and remove the modules at the input/output numbers beyond the number of input/output points or GOT.

Table 6.1 Error Code List for AnNCPU (Continue)

Error Message	Error Code (D9008)	CPU States	Error and Cause	Corrective Action
"SP. UNIT ERROR" (Checked at the execution of FROM and TO instructions)	46	Stop or Continue (set by parameter)	Access (execution of FROM to TO instruction) has been made to a location where there is not special function unit.	Read the error step by use of peripheral equipment, and check and correct the content of FROM or TO instruction at that step.
"LINK PARA. ERROR"	47	Continue	(1) If a data link CPU is used to set a master station (station number "00") : The contents written to the parameter area of link by setting the link range in the parameter setting of peripheral devices are different from the link parameter contents for some reason. Or, link parameters are not written. (2) The setting of the total number of slave stations is 0.	(1) Write parameters again and make check. (2) Check setting of station numbers. (3) When the error is displayed again, it is hardware error. Therefore, consult Mitsubishi representative.
"OPERATION ERROR" (Checked during execution of instruction)	50	Continue	(1) The result of BCD conversion has exceeded the specified range (9999 or 99999999). (2) Operation impossible because specified device range has been exceeded. (3) File registers used in program without capacity setting. (4) Operation error occurred during execution of the RTOP, RFRP, LWTP or LRDP instruction.	Read the error step using peripheral devices and check the program at the error step, and correct it. (Check the specified device range, BCD conversion, or the like.)

Table 6.1 Error Code List for AnNCPU (Continue)

Error Message	Error Code (D9008)	CPU States	Error and Cause	Corrective Action
"MAIN CPU DOWN" (Interrupt fault) AnNCPU only	60	Stop	(1) INT instruction processed in microcomputer program area. (2) CPU malfunction due to noise. (3) Hardware error of CPU module.	(1) Because the INT instruction cannot be used in the microcomputer program, remove it. (2) Take measures against noises. (3) Replace the CPU module.
"BATTERY ERROR" (Checked at power-on)	70	Continue	(1) The battery voltage has dropped to below the specified value. (2) The lead connector of the battery is not connected.	(1) Replace battery. (2) Connect the lead connector if RAM memory or power failure compensation function is used.

6.2 Error Code List for AnACPU

The causes and corrective actions for error code, error message and detailed error with AnACPU are shown below.

Table 6.2 Error Code List for AnACPU

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"INSTRCT CODE ERR" (Checked when STOP → RUN or at execution of instruction.)	10	101	STOP	Instruction codes which the CPU cannot decode are included in the program.	(1) Read the error step using a peripheral device and correct the program of the step. (2) Check the ROM if it contains instruction codes which cannot be decoded. If it does, replace it witha correct ROM.
		102		Index qualification is specified for a 32-bit constant.	Read the error step using a peripheral device and correct the program of the step.
		103		Device specified by a dedicated instruction is not correct.	
		104		An dedicated instruction has incorrect program structure.	
		105		An dedicated instruction has incorrect command name.	
		106		Index qualification using Z or V is included in the program between LEDA/B IX and LEDA/B IXEND.	

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"INSTRCT CODE ERR" (Checked when STOP → RUN or at execution of instruction.)	10	107	STOP	(1) Index qualification is specified for the device numbers and set values in the [OUT] instruction of timers and counters. (2) Index qualification is specified at the label number of the pointer (P) provided to the head of destination of the [CJ], [SCJ], [CALL], [CALLP], [JMP], [LEDA/B], [FCALL] and [LEDA/B], [BREAK] instructions or at the label number of the interrupt pointer (I) provided to the head of an interrupt program.	Read the error step using a peripheral device and correct the program of the step.
		108		Errors other than 101 to 107 mentioned above.	

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"PARAMETER ERROR" (Checked at power on and at STOP/PAUSE → RUN.)	11	111	STOP	Capacity settings of the main and sub programs, microcomputer program, file register comments, status latch, sampling trace and extension file registers are not within the usable range of the CPU.	Read parameters in the CPU memory, check the contents, make necessary corrections and write them again to the memory.
		112		Total of the set capacity of the main and sub programs, file register comments, status latch, sampling trace and extension file registers exceeds capacity of the memory cassette.	
		113		Latch range set by parameters or setting of M, L or S is incorrect.	Read parameters in the CPU memory, check the contents, make necessary corrections and write them again to the memory
		114		Sum check error	
		115		Either of settings of the remote RUN/ PAUSE contact point by parameters, operation mode at occurrence of error, annunciator indication mode, or STOP → RUN indication mode is incorrect.	
		116		The MNET-MINI automatic refresh setting by parameters is incorrect.	
		117		Timer setting by parameters is incorrect.	
		118		Counter setting by parameters is incorrect.	

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"MISSING END INS" (Checked at STOP → RUN.)	12	121	STOP	The END (FEND) instruction is not given in the main program.	Write the END instruction at the end of the main program.
		122		The END (FEND) instruction is not given in the sub program if the sub program is set by parameters.	Write the END instruction at the end of the sub program.
"CAN'T EXECUTE (P)" (Checked at execution of instruction.)	13	131	STOP	The same device number is used at two or more steps for the pointers (P) and interrupt pointers (I) used as labels to be specified at the head of jump destination.	Eliminate the same pointer numbers provided at the head of jump destination.
		132		Label of the pointer (P) specified in the CJ , SCJ , CALL , CALLP , JMP , LEDA/B FCALL or LEDA/B BREAK instruction is not provided before the END instruction.	Read the error step using a peripheral device, check contents and insert a jump destination pointer (P).

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"CAN'T EXECUTE (P)" (Checked at execution of instruction.)	13	133	STOP	(1) The RET instruction was included in the program and executed though the CALL instruction was not given. (2) The NEXT LEDA/B BREAK instructions were included in the program and executed though the FOR instruction was not given. (3) Nesting level of the CALL, CALLP and FOR instructions is 6 levels or deeper, and the 6th level was executed. (4) There is no RET or NEXT instruction at execution of the CALL or FOR instruction.	(1) Read the error step using a peripheral device, check contents and correct program of the step. (2) Reduce the number of nesting levels of the CALL, CALLP and FOR instructions to 5 or less.

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"CAN'T EXECUTE (P)" (Checked at execution of instruction.)	13	134	STOP	The CHG instruction was included in the program and executed though no sub program was provided.	Read the error step using a peripheral device and delete the CHG instruction circuit block.
		135		(1) LEDA/B IX and LEDA/B IXEND instructions are not paired. (2) There are 33 or more sets of LEDA/B IX and LEDA/B IXEND instructions.	(1) Read the error step using a peripheral device, check contents and correct program of the step. (2) Reduce the number of sets of LEDA/B IX and LEDA/B IXEND instructions to 32 or less.
"CHK FORMAT ERR" (Checked at STOP/PAUSE → RUN.)	14	141	STOP	Instructions (including NOP) other than LDX, LDIX, ANDX and ANIX are included in the CHK instruction circuit block.	Check the program of the CHK instruction and correct it referring to contents of detailed error codes.
		142		Multiple CHK instructions are given.	
		143		The number of contact points in the CHK instruction circuit block exceeds 150.	
		144		The LEDA CHK instructions are not paired with the LEDA CHKEND instructions, or 2 or more pairs of them are given.	

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"CHK FORMAT ERR" (Checked at STOP/PAUSE → RUN.)	14	145	STOP	Format of the block shown below, which is provided before the CHK instruction circuit block, is not as specified. P254 CJ P⬚⬚	Check the program of the CHK instruction and correct it referring to contents of detailed error codes.
		146		Device number of D1 in the CHK D1 D2 instruction is different from that of the contact point before the CJ P⬚ instruction.	
		147		Index qualification is used in the check pattern circuit.	
		148		(1) Multiple check pattern circuits of the LEDA CHK - LEDA CHKEND instructions are given. (2) There are 7 or more check condition circuits in the LEDA CHK - LEDA CHKEND instructions. (3) The check condition circuits in the LEDA CHK - LEDA CHKEND instructions are written without using X and Y contact instructions or compare instructions. (4) The check pattern circuits of the LEDA CHK - LEDA CHKEND instructions are written with 257 or more steps.	

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"CAN'T EXECUTE (I)" (Checked at occurrence of interrupt.)	15	151	STOP	The IRET instruction was given outside of the interrupt program and was executed.	Read the error step using a peripheral device and delete the IRET instruction.
		152		There is no IRET instruction in the interrupt program.	Check the interrupt program if the IRET instruction is given in it. Write the IRET instruction if it is not given.
		153		Though an interrupt module is used, no interrupt pointer (I) which corresponds to the module is given in the program. Upon occurrence of error, the problem pointer (I) number is stored at D9011.	Monitor special register D9011 using a peripheral device, and check if the interrupt program that corresponds to the stored data is provided or if two or more interrupt pointers (I) of the same number are given. Make necessary corrections.
"CASSETTE ERROR"	16	—	STOP	Memory cassette is not loaded.	Turn off the PC power and load the memory cassette.
"RAM ERROR" (Checked at power on.)	20	201	STOP	The sequence program storage RAM in the CPU module caused an error.	Since this is CPU hardware error, consult Mitsubishi representative.
		202		The work area RAM in the CPU module caused an error.	
		203		The device memory in the CPU module caused an error.	
		204		The address RAM in the CPU module caused an error.	

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"OPE CIRCUIT ERROR" (Checked at power on.)	21	211	STOP	The operation circuit for index qualification in the CPU does not work correctly.	Since this is CPU hardware error, consult Mitsubishi representative.
		212		Hardware (logic) in the CPU does not operate correctly.	
		213		The operation circuit for sequential processing in the CPU does not operate correctly.	
"WDT ERROR" (Checked at execution of END processing.)	22	—	STOP	Scan time is longer than the WDT time. (1) Scan time of the user's program has been extended due to certain conditions. (2) Scan time has been extended due to momentary power failure occurred during scanning.	(1) Calculate and check the scan time of user program and reduce the scan time using the CJ instruction or the like. (2) Monitor contents of special register D9005 using a peripheral device. If the contents are other than 0, power supply voltage may not be stable. Check power supply and reduce variation in voltage.

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"END NOT EXECUTE" (Checked at execution of the END instruction.)	24	241	STOP	Whole program of specified program capacity was executed without executing the END instructions. (1) When the END instruction was to be executed, the instruction was read as other instruction code due to noise. (2) The END instruction changed to other instruction code due to unknown cause.	(1) Reset and run the CPU again. If the same error recurs, Since this is CPU hardware error, consult Mitsubishi representative.
"MAIN CPU DOWN"	26	—	STOP	The main CPU is malfunctioning or faulty.	Since this is CPU hardware error, consult Mitsubishi representative
"UNIT VERIFY ERR" (Checked continuously.)	31	—	Stop or Continue (set by parameter)	Current I/O module information is different from that recognized when the power was turned on. (1) The I/O module (including special function modules) connection became loose or the module was disconnected during operation, or wrong module was connected.	Read detailed error code using a peripheral device and check or replace the module which corresponds to the data (I/O head number). Or, monitor special registers D9116 to D9123 using a peripheral device and check or replace the modules if corresponding data bit is "1".

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"FUSE BREAK OFF" (Checked continuously.)	32	—	Stop or Continue (set by parameter)	There is an output module of which fuse is blown.	(1) Check the FUSE BLOWN indicator LED on the output module and replace the fuse. (2) Read detailed error code using a peripheral device and replace the fuse of the output module which corresponds to the data (I/O head number). Or, monitor special registers D9100 to D9107 using a peripheral device and replace the fuse of the output module of which corresponding data bit is "1".
"CONTROL-BUS ERR"	40	401	STOP	Due to the error of the control bus which connects to special function modules, the FROM/TO instruction cannot be executed.	Since it is a hardware error of special function module, CPU module or base module, replace and check defective module(s). Consult Mitsubishi representative for defective modules.
		402		If parameter I/O assignment is being executed, special function modules are not accessible at initial communication. At error occurrence, the head I/O number (upper 2 digits of 3 digits) of the special function module that caused error is stored at D9011.	

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"SP.UNIT DOWN"	41	411	STOP	Though an access was made to a special function module at execution of the FROM/TO instruction, no response is received.	Since it is hardware error of the special function module to which an access was made, consult Mitsubishi representative.
		412		If parameter I/O assignment is being executed, no response is received from a special function module at initial communication. At error occurrence, the head I/O number (upper 2 digits of 3 digits) of the special function module that caused error is stored at D9011.	
"LINK UNIT ERROR"	42	—	STOP	(1) Either data link module is loaded to the master station. (2) There are 2 link modules which are set to the master station (station 0).	(1) Remove data link module from the master station. (2) Reduce the number of master stations to 1. Reduce the link modules to 1 when the 3-tier system is not used.
"I/O INT. ERROR"	43	—	STOP	Though the interrupt module is not loaded, an interrupt occurred.	Since it is hardware error of a module, replace and check a defective module. For defective modules, consult Mitsubishi representative.

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"SP.UNIT LAY.ERR."	44	441	STOP	A special function module is assigned as an I/O module, or vice versa, in the I/O assignment using parameters from the peripheral device.	Execute I/O assignment again using parameters from the peripheral device according to the loading status of special function modules.
		442		There are 9 or more special function modules (except the interrupt module) which can execute interruption to the CPU module loaded.	Reduce the special function modules (except the interrupt module) which can execute interrupt start to 8 or less.
		443		There are 2 or more data link modules loaded.	Reduce the data link modules to 1 or less.
		444		There are 7 or more modules such as a computer link module loaded to one CPU module.	Reduce the computer link modules to 6 or less.
		445		There are 2 or more interrupt modules loaded.	Reduce the interrupt modules to 1 or less.
		446		Modules assigned by parameters for MNT/MINI automatic refresh from the peripheral device do not conform with the types of station modules actually linked.	Perform again module assignment for MNT/MINI automatic refresh with parameters according to actually linked station modules.

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"SP.UNIT LAY.ERR."	44	447	STOP	The number of modules of I/O assignment registration (number of loaded modules) per one CPU module for the special function modules which can use dedicated instructions is larger than the specified limit. (Total of the number of computers shown below is larger than 1344.) (AD59 × 5) (AD57(S1)/AD58 × 8) (AJ71C24(S3/S6/S8) × 10) (AJ71UC24 × 10) (AJ71C21(S1) (S2) × 29) + ((AJ71PT32(S3) in extension mode x 125) Total > 1344	Reduce the number of loaded special function modules.
"SP.UNIT ERROR" (Checked at execution of the FROM/TO instruction or the dedicated instructions for special function modules.)	46	461	Stop or Continue (set by parameter)	Module specified by the FROM / TO instruction is not a special function module.	Read the error step using a peripheral device and check and correct contents of the FROM / TO instruction of the step.
		462		Module specified by the dedicated instruction for special function module is not a special function module or not a corresponding special function module.	Read the error step using a peripheral device and check and correct contents of the dedicated instruction for special function modules of the step.

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"LINK PARA. ERROR"	47	—	Continue	(1) Data written to the parameter areas of the link of which range was set by parameters using a peripheral device does not conform with the data of link parameters read by the CPU. Or, link parameters are not written. (2) Total number of local stations is set at 0.	(1) Write in parameters again and check. (2) Check setting of station numbers. (3) If the same error indication is given again, it is hardware failure. Consult Mitsubishi representative.
"OPERATION ERROR" (Checked at execution of instruction.)	50	501	Stop or Continue (set by parameter)	(1) When file registers (R) are used, operation is executed outside of specified ranges of device numbers and block numbers of file registers (R). (2) File registers are used in the program without setting capacity of file registers.	Read the error step using a peripheral device and check and correct program of the step.
		502		Combination of the devices specified by instruction is incorrect.	
		503		Stored data or constant of specified device is not in the usable range.	
		504		Set number of data to be handled is out of the usable range.	

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"OPERATION ERROR" (Checked at execution of instruction.)	50	505	Stop or Continue (set by parameter)	(1) Station number specified by the LEDA/B LRDP, LEDA/B LWTP, [LRDP], [LWTP] instructions is not a local station. (2) Head I/O number specified by the LEDA/B RFRP, LEDA/B RTOP, [RFRP], [RTOP] instructions is not of a remote station.	Read the error step using a peripheral device and check and correct program of the step.
		506		Head I/O number specified by the LEDA/B RFRP, LEDA/B RTOP, [RFRP], [RTOP] instructions is not of a special function module.	
		507		(1) When the AD57(S1) or AD58 was executing instructions in divided processing mode, other instructions were executed to either of them. (2) When an AD57(S1) or AD58 was executing instructions in divided processing mode, other instructions were executed in divided mode to another AD57(S1) or AD58.	Read the error step using a peripheral device and provide interlock with special relay M9066 or modify program structure so that, when the AD57(S1) or AD58 is executing instructions in divided processing mode, other instructions may not be executed to either of them or to another AD57(S1) or AD58 in divided mode.

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"OPERATION ERROR" (Checked at execution of instruction.)	50	509	STOP	(1) An instruction which cannot be executed by remote terminal modules connected to the MNET/MINI-S3 was executed to the modules. (2) When the PRC instruction was executed to a remote terminal, the communication request registration areas overflowed. (3) The PIDCONT instruction was executed without executing the PIDINIT instruction. The PID57 instruction was executed without executing the PIDINIT or PIDCONT instruction.	(1) Read the error step using a peripheral device and correct the program, meeting loaded conditions of remote terminal modules. (2) Provide interlock using M9081 (communication request registration areas BUSY signal) or D9081 (number of vacant areas in the communication request registration areas) when the PRC instruction is executed to a remote terminal. (3) Execute the PIDCONT instruction after execution of the PIDINIT instruction.Execute the PID57 instruction after execution of the PIDINIT and PIDCONT instructions.

Table 6.2 Error Code List for AnACPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"MAIN CPU DOWN"	60	—	STOP	(1) The CPU malfunctioned due to noise. (2) Hardware failure.	(1) Take proper countermeasures for noise. (2) Hardware failure.
		602		(1) Failure in the power module, CPU module, main base unit or expansion cable is detected.	(1) Replace the power module, CPU module, main base unit or expansion cable.
"BATTERY ERROR" (Checked at power on.)	70	—	Continue	(1) Battery voltage has lowered below specified level. (2) Battery lead connector is not connected.	(1) Replace battery. (2) If a RAM memory or power failure compensation function is used, connect the lead connector.

6.3 Error Code List for AnUCPU

The causes and corrective actions for error code, error message and detailed error with AnUCPU are shown below.

*1 denotes those error codes that occur only with the AnUCPU.
*2 denotes those error codes that occur only with the A4UCPU.

Table 6.3 Error Code List for AnUCPU

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"INSTRCT CODE ERR" (Checked when STOP → RUN or at execution of instruction.)	10	101	STOP	Instruction codes which the CPU cannot decode are included in the program.	(1) Read the error step using a peripheral device and correct the program of the step. (2) Check the ROM if it contains instruction codes which cannot be decoded. If it does, replace it with a correct ROM.
		102		Index qualification is specified for a 32-bit constant.	Read the error step using a peripheral device and correct the program of the step.
		103		Device specified by a dedicated instruction is not correct.	
		104		An dedicated instruction has incorrect program structure.	
		105		An dedicated instruction has incorrect command name.	
		106		Index qualification using Z or V is included in the program between LEDA/B IX and LEDA/B IXEND.	

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"INSTRCT CODE ERR" (Checked when STOP → RUN or at execution of instruction.)	10	107	STOP	(1) Index qualification is specified for the device numbers and set values in the [OUT] instruction of timers and counters. (2) Index qualification is specified at the label number of the pointer (P) provided to the head of destination of the [CJ], [SCJ], [CALL], [CALLP], [JMP], [LEDA/B], [FCALL] and [LEDA/B], [BREAK] instructions or at the label number of the interrupt pointer (I) provided to the head of an interrupt program.	Read the error step using a peripheral device and correct the program of the step.
		108		Errors other than 101 to 107 mentioned above.	

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"PARAMETER ERROR" (Checked at power on and at STOP/PAUSE → RUN.)	11	111	STOP	Capacity settings of the main and sub programs, microcomputer program, file register comments, status latch, sampling trace and extension file registers are not within the usable range of the CPU.	Read parameters in the CPU memory, check the contents, make necessary corrections and write them again to the memory.
		112		Total of the set capacity of the main and sub programs, file register comments, status latch, sampling trace and extension file registers exceeds capacity of the memory cassette.	
		113		Latch range set by parameters or setting of M, L or S is incorrect.	
		114		Sum check error	
		115		Either of settings of the remote RUN/ PAUSE contact point by parameters, operation mode at occurrence of error, annunciator indication mode, or STOP → RUN indication mode is incorrect.	
		116		The MNET-MINI automatic refresh setting by parameters is incorrect.	
		117		Timer setting by parameters is incorrect.	
		118		Counter setting by parameters is incorrect.	

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"MISSING END INS" (Checked at STOP → RUN.)	12	121	STOP	The END (FEND) instruction is not given in the main program.	Write the END instruction at the end of the main program.
		122		The END (FEND) instruction is not given in the sub program if the sub program is set by parameters.	
		123		(1)When subprogram 2 is set by a parameter, there is no END (FEND) instruction in subprogram 2. (2)When subprogram 2 is set by a parameter, subprogram 2 has not been written from a peripheral device.	
		124		(1)When subprogram 3 is set by a parameter, there is no END (FEND) instruction in subprogram 3. (2)When subprogram 3 is set by a parameter, subprogram 2 has not been written from a peripheral device.	

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"CAN'T EXECUTE (P)" (Checked at execution of instruction.)	13	131	STOP	The same device number is used at two or more steps for the pointers (P) and interrupt pointers (I) used as labels to be specified at the head of jump destination.	Eliminate the same pointer numbers provided at the head of jump destination.
		132		Label of the pointer (P) specified in the CJ, SCJ, CALL, CALLP, JMP, LEDA/B FCALL or LEDA/B BREAK instruction is not provided before the END instruction.	Read the error step using a peripheral device, check contents and insert a jump destination pointer (P).
		133		(1) The RET instruction was included in the program and executed though the CALL instruction was not given. (2) The NEXT LEDA/B BREAK instructions were included in the program and executed though the FOR instruction was not given.	(1) Read the error step using a peripheral device, check contents and correct program of the step. (2) Reduce the number of nesting levels of the CALL, CALLP and FOR instructions to 5 or less.

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"CAN'T EXECUTE (P)" (Checked at execution of instruction.)	13	133	STOP	(3) Nesting level of the CALL, CALLP and FOR instructions is 6 levels or deeper, and the 6th level was executed. (4) There is no RET or NEXT instruction at execution of the CALL or FOR instruction.	(1) Read the error step using a peripheral device, check contents and correct program of the step. (2) Reduce the number of nesting levels of the CALL, CALLP and FOR instructions to 5 or less.
		134		The CHG instruction was included in the program and executed though no sub program was provided.	Read the error step using a peripheral device and delete the CHG instruction circuit block.
		135		(1) LEDA/B IX and LEDA/B IXEND instructions are not paired. (2) There are 33 or more sets of LEDA/B IX and LEDA/B IXEND instructions.	(1) Read the error step using a peripheral device, check contents and correct program of the step. (2) Reduce the number of sets of LEDA/B IX and LEDA/B IXEND instructions to 32 or less.

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"CHK FORMAT ERR" (Checked at STOP/PAUSE → RUN.)	14	141	STOP	Instructions (including NOP) other than LDX, LDIX, ANDX and ANIX are included in the CHK instruction circuit block.	Check the program of the CHK instruction and correct it referring to contents of detailed error codes.
		142		Multiple CHK instructions are given.	
		143		The number of contact points in the CHK instruction circuit block exceeds 150.	
		144		The LEDA CHK instructions are not paired with the LEDA CHKEND instructions, or 2 or more pairs of them are given.	
		145		Format of the block shown below, which is provided before the CHK instruction circuit block, is not as specified. 	
		146		Device number of D1 in the CHK D1 D2 instruction is different from that of the contact point before the CJ P instruction.	
		147		Index qualification is used in the check pattern circuit.	

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"CHK FORMAT ERR" (Checked at STOP/PAUSE → RUN.)	14	148	STOP	(1) Multiple check pattern circuits of the LEDA CHK - LEDA CHKEND instructions are given. (2) There are 7 or more check condition circuits in the LEDA CHK - LEDA CHKEND instructions. (3) The check condition circuits in the LEDA CHK - LEDA CHKEND instructions are written without using X and Y contact instructions or compare instructions. (4) The check pattern circuits of the LEDA CHK - LEDA CHKEND instructions are written with 257 or more steps.	Check the program of the CHK instruction and correct it referring to contents of detailed error codes.

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"CAN'T EXECUTE (I)" (Checked at occurrence of interrupt.)	15	151	STOP	The IRET instruction was given outside of the interrupt program and was executed.	Read the error step using a peripheral device and delete the IRET instruction.
		152		There is no IRET instruction in the interrupt program.	Check the interrupt program if the IRET instruction is given in it. Write the IRET instruction if it is not given.
		153		Though an interrupt module is used, no interrupt pointer (I) which corresponds to the module is given in the program. Upon occurrence of error, the problem pointer (I) number is stored at D9011.	Monitor special register D9011 using a peripheral device, and check if the interrupt program that corresponds to the stored data is provided or if two or more interrupt pointers (I) of the same number are given. Make necessary corrections.
"CASSETTE ERROR"	16	—	STOP	Memory cassette is not loaded.	Turn off the PC power and load the memory cassette.
"RAM ERROR" (Checked at power on.)	20	201	STOP	The sequence program storage RAM in the CPU module caused an error.	Since this is CPU hardware error, consult Mitsubishi representative.
		202		The work area RAM in the CPU module caused an error.	
		203		The device memory in the CPU module caused an error.	
		204		The address RAM in the CPU module caused an error.	

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"OPE CIRCUIT ERROR" (Checked at power on.)	21	211	STOP	The operation circuit for index qualification in the CPU does not work correctly.	Since this is CPU hardware error, consult Mitsubishi representative.
		212		Hardware (logic) in the CPU does not operate correctly.	
		213		The operation circuit for sequential processing in the CPU does not operate correctly.	
"OPE. CIRCUIT ERR." (Checked at execution of the END instruction)		214		In the END processing check, the operation circuit for index qualification in the CPU does not work correctly.	
		215		In the END processing check, the hardware in the CPU does not operate correctly.	
"WDT ERROR" (Checked at execution of END processing.)	22	—	STOP	Scan time is longer than the WDT time. (1) Scan time of the user's program has been extended due to certain conditions. (2) Scan time has been extended due to momentary power failure occurred during scanning.	(1) Calculate and check the scan time of user program and reduce the scan time using the CJ instruction or the like. (2) Monitor contents of special register D9005 using a peripheral device. If the contents are other than 0, power supply voltage may not be stable. Check power supply and reduce variation in voltage.

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"END NOT EXECUTE" (Checked at execution of the END instruction.)	24	241	STOP	Whole program of specified program capacity was executed without executing the END instructions. (1) When the END instruction was to be executed, the instruction was read as other instruction code due to noise. (2) The END instruction changed to other instruction code due to unknown cause.	(1) Reset and run the CPU again. If the same error recurs, Since this is CPU hardware error, consult Mitsubishi representative.
"MAIN CPU DOWN"	26	—	STOP	The main CPU is malfunctioning or faulty.	Since this is CPU hardware error, consult Mitsubishi representative
"UNIT VERIFY ERR" (Checked continuously.)	31	—	Stop or Continue (set by parameter)	Current I/O module information is different from that recognized when the power was turned on. (1) The I/O module (including special function modules) connection became loose or the module was disconnected during operation, or wrong module was connected.	Read detailed error code using a peripheral device and check or replace the module which corresponds to the data (I/O head number). Or, monitor special registers D9116 to D9123 using a peripheral device and check or replace the modules if corresponding data bit is "1".

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"FUSE BREAK OFF" (Checked continuously.)	32	—	Stop or Continue (set by parameter)	(1) There is an output module of which fuse is blown. (2) The external power supply for output load is turned OFF or is not connected.	(1) Check the FUSE BLOWN indicator LED on the output module and replace the fuse. (2) Read detailed error code using a peripheral device and replace the fuse of the output module which corresponds to the data (I/O head number). Or, monitor special registers D9100 to D9107 using a peripheral device and replace the fuse of the output module of which corresponding data bit is "1". (3) Check the ON/OFF status of the external power supply for output load.

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"CONTROL -BUS ERR"	40	401	STOP	Due to the error of the control bus which connects to special function modules, the FROM / TO instruction cannot be executed.	Since it is a hardware error of special function module, CPU module or base module, replace and check defective module(s). Consult Mitsubishi representative for defective modules.
		402		If parameter I/O assignment is being executed, special function modules are not accessible at initial communication. At error occurrence, the head I/O number (upper 2 digits of 3 digits) of the special function module that caused error is stored at D9011.	
"SP.UNIT DOWN"	41	411	STOP	Though an access was made to a special function module at execution of the FROM / TO instruction no response is received.	Since it is hardware error of the special function module to which an access was made, consult Mitsubishi representative.
		412		If parameter I/O assignment is being executed, no response is received from a special function module at initial communication. At error occurrence, the head I/O number (upper 2 digits of 3 digits) of the special function module that caused error is stored at D9011.	

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"LINK UNIT ERROR"	42	—	STOP	(1) Either data link module is loaded to the master station. (2) There are 2 link modules which are set to the master station (station 0).	(1) Remove data link module from the master station. (2) Reduce the number of master stations to 1. Reduce the link modules to 1 when the 3-tier system is not used.
"I/O INT. ERROR"	43	—	STOP	Though the interrupt module is not loaded, an interrupt occurred.	Since it is hardware error of a module, replace and check a defective module. For defective modules, consult Mitsubishi representative.
"SP.UNIT LAY.ERR."	44	441	STOP	A special function module is assigned as an I/O module, or vice versa, in the I/O assignment using parameters from the peripheral device.	Execute I/O assignment again using parameters from the peripheral device according to the loading status of special function modules.
		442		There are 9 or more special function modules (except the interrupt module) which can execute interruption to the CPU module loaded.	Reduce the special function modules (except the interrupt module) which can execute interrupt start to 8 or less.
		443		There are 2 or more data link modules loaded.	Reduce the data link modules to 1 or less.
		444		There are 7 or more modules such as a computer link module loaded to one CPU module.	Reduce the computer link modules to 6 or less.

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"SP.UNIT LAY.ERR."	44	445	STOP	There are 2 or more interrupt modules loaded.	Reduce the interrupt modules to 1 or less.
		446		Modules assigned by parameters for MNT/MINI automatic refresh from the peripheral device do not conform with the types of station modules actually linked.	Perform again module assignment for MNT/MINI automatic refresh with parameters according to actually linked station modules.
		447		The number of modules of I/O assignment registration (number of loaded modules) per one CPU module for the special function modules which can use dedicated instructions is larger than the specified limit. (Total of the number of computers shown below is larger than 1344.) (AD59 × 5) (AD57(S1)/AD58 × 8) (AJ71C24(S3/S6/S8) × 10) (AJ71UC24 × 10) (AJ71C21(S1) (S2) × 29) + ((AJ71PT32(S3) in extension mode x 125) Total > 1344	Reduce the number of loaded special function modules.
		448*		(1) Five or more network modules have been installed. (2) A total of five or more of network modules and data link modules have been installed.	Make the total of the installed network modules and data link modules four or less.

Table 6.3 Error Code List for AnUCPU

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"SP.UNIT ERROR" (Checked at execution of the FROM/TO instruction or the dedicated instructions for special function modules.)	46	461	Stop or Continue (set by parameter)	Module specified by the FROM / TO instruction is not a special function module.	Read the error step using a peripheral device and check and correct contents of the FROM / TO instruction of the step.
		462		(1) Module specified by the dedicated instruction for special function module is not a special function module or not a corresponding special function module. (2) A command was issued to a CC-Link module with function version under B. (3) A CC-Link dedicated command was issued to a CC-Link module for which the network parameters have not been set.	(1) Read the error step using a peripheral device and check and correct contents of the dedicated instruction for special function modules of the step. (2) Replace with a CC-Link module having function version B and above. (3) Set the parameters.

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"LINK PARA. ERROR"	47	0	Continue	[When using MELSECNET/(II)] (1) When the link range at a data link CPU which is also a master station (station number = 00) is set by parameter setting at a peripheral device, for some reason the data written to the link parameter area differs from the link parameter data read by the CPU. Alternatively, no link parameters have been written. (2) The total number of slave stations is set at 0.	(1) Write the parameters again and check. (2) Check the station number settings. (3) Persistent error occurrence may indicate a hardware fault. Consult your nearest Mitsubishi representative, explaining the nature of the problem.
		470*		[When using MELSECNET/10] (1) The contents of the network refresh parameters written from a peripheral device differ from the actual system at the base unit. (2) The network refresh parameters have not been written.	Write the network refresh parameters again and check.

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"LINK PARA. ERROR"	47	471*	Continue	[When using MELSECNET/10] (1) The transfer source device range and transfer destination device range specified for the inter-network transfer parameters are in the same network. (2) The specified range of transfer source devices or transfer destination devices for the inter-network transfer parameters spans two or more networks. (3) The specified range of transfer source devices or transfer destination devices for the inter-network transfer parameters is not used by the network.	Write the network parameters again and check.
		472*		[When using MELSECNET/10] The contents of the routing parameters written from a peripheral device differ from the actual network system.	Write the routing parameters again and check.

Table 6.3 Error Code List for AnUCPU

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"LINK PARA. ERROR"	47	473*	Continue	[When using MELSECNET/10] (1) The contents of the network parameters for the first link unit, written from a peripheral device, differ from the actual network system. (2) The link parameters for the first link unit have not been written. (3) The setting for the total number of stations is 0.	(1) Write the parameters again and check. (2) Check the station number settings. (3) Persistent error occurrence may indicate a hardware fault. Consult your nearest Mitsubishi representative, explaining the nature of the problem.
		474*		[When using MELSECNET/10] (1) The contents of the network parameters for the second link unit, written from a peripheral device, differ from the actual network system. (2) The link parameters for the second link unit have not been written. (3) The setting for the total number of stations is 0.	

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"LINK PARA. ERROR"	47	475*	Continue	[When using MELSECNET/10] (1) The contents of the network parameters for the third link unit, written from a peripheral device, differ from the actual network system. (2) The link parameters for the third link unit have not been written. (3) The setting for the total number of stations is 0.	(1) Write the parameters again and check. (2) Check the station number settings. (3) Persistent error occurrence may indicate a hardware fault. Consult your nearest Mitsubishi representative, explaining the nature of the problem.
		476*		[When using MELSECNET/10] (1) The contents of the network parameters for the fourth link unit, written from a peripheral device, differ from the actual network system. (2) The link parameters for the fourth link unit have not been written. (3) The setting for the total number of stations is 0.	
		477		A ink parameter error was detected by the CC-Link module.	(1) Write the parameters in again and check. (2) If the error appears again, there is a problem with the hardware. Consult your nearest System Service, sales office or branch office.

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"OPERATION ERROR" (Checked at execution of instruction.)	50	501	Stop or Continue (set by parameter)	(1) When file registers (R) are used, operation is executed outside of specified ranges of device numbers and block numbers of file registers (R). (2) File registers are used in the program without setting capacity of file registers.	Read the error step using a peripheral device and check and correct program of the step.
		502		Combination of the devices specified by instruction is incorrect.	
		503		Stored data or constant of specified device is not in the usable range.	
		504		Set number of data to be handled is out of the usable range.	
		505		(1) Station number specified by the LEDA/B LRDP, LEDA/B LWTP, LRDP, LWTP instructions is not a local station. (2) Head I/O number specified by the LEDA/B RFRP, LEDA/B RTOP, RFRP, RTOP instructions is not of a remote station.	

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"OPERATION ERROR" (Checked at execution of instruction.)	50	506	Stop or Continue (set by parameter)	Head I/O number specified by the LEDA/B RFRP LEDA/B RTOP, RFRP, RTOP instructions is not of a special function module.	Read the error step using a peripheral device and check and correct program of the step.
		507		(1) When the AD57(S1) or AD58 was executing instructions in divided processing mode, other instructions were executed to either of them. (2) When an AD57(S1) or AD58 was executing instructions in divided processing mode, other instructions were executed in divided mode to another AD57(S1) or AD58.	Read the error step using a peripheral device and provide interlock with special relay M9066 or modify program structure so that, when the AD57(S1) or AD58 is executing instructions in divided processing mode, other instructions may not be executed to either of them or to another AD57(S1) or AD58 in divided mode.
		508		A CC-Link dedicated command was issued to three or more CC-Link modules.	The CC-Link dedicated command can be issued only to two or less CC-Link modules.

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"OPERATION ERROR" (Checked at execution of instruction.)	50	509	STOP	(1) An instruction which cannot be executed by remote terminal modules connected to the MNET/MINI-S3 was executed to the modules. (2) When the PRC instruction was executed to a remote terminal, the communication request registration areas overflowed. (3) The PIDCONT instruction was executed without executing the PIDINIT instruction. The PID57 instruction was executed without executing the PIDINIT or PIDCONT instruction. (4) The number of CC-Link dedicated command executed in one scan exceeded 10.	(1) Read the error step using a peripheral device and correct the program, meeting loaded conditions of remote terminal modules. (2) Provide interlock using M9081 (communication request registration areas BUSY signal) or D9081 (number of vacant areas in the communication request registration areas) when the PRC instruction is executed to a remote terminal. (3) Execute the PIDCONT instruction after execution of the PIDINIT instruction. Execute the PID57 instruction after execution of the PIDINIT and PIDCONT instructions. (4) Set the number of CC-Link dedicated commands executed in one scan to 10 or less.

Table 6.3 Error Code List for AnUCPU (Continue)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	CPU States	Error and Cause	Corrective Action
"MAIN CPU DOWN"	60	—	STOP	(1) The CPU malfunctioned due to noise. (2) Hardware failure.	(1) Take proper countermeasures for noise. (2) Hardware failure.
		602		(1) Failure in the power module, CPU module, main base unit or expansion cable is detected.	(1) Replace the power module, CPU module, main base unit or expansion cable.
"BATTERY ERROR" (Checked at power on.)	70	—	Continue	(1) Battery voltage has lowered below specified level. (2) Battery lead connector is not connected.	(1) Replace battery. (2) If a RAM memory or power failure compensation function is used, connect the lead connector.

7. TRANSPORTATION PRECAUTIONS

When transporting lithium batteries, make sure to treat them based on the transport regulations.

7.1 Controlled Models

The battery for AnNCPU, AnACPU and AnUCPU is classified as follows:

Product Name	Model	Product supply status	Classification for transportation
A series battery	A6BAT	Lithium battery	Non-dangerous goods

7.2 Transport Guidelines

Comply with IATA Dangerous Goods Regulations, IMDG code and the local transport regulations when transporting products after unpacking or repacking, while Mitsubishi ships products with packages to comply with the transport regulations.

Also, contact the transporters.

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; machine damage or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠ For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi.
- This product has been manufactured under strict quality control. However, when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

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